LH-14

NASA News

National Aeronautics and
Space Administration

Washington, D.C. 20546
AC 202 755-8370

For Release

IMMEDIATE

Nicholas Panagakos
Headquarters, Washington, D.C.
(Phone: 202/755-3680)

Frank Bristow
NASA Jet Propulsion Laboratory, Pasadena, Calif.
(Phone: 213/354-5011)

RELEASE NO: 78-2

NOTE TO EDITORS: CORRECTION

In Release No. 77-258 (Status of Voyager Spacecraft, Jan. 1, 1978), dates of Jupiter encounters (closest approach) for Voyagers 1 and 2 should read March 5, 1979, and July 9, 1979, respectively.

-end-

Mailed:
January 4, 1978

LH-14

NASA News

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For Release

IMMEDIATE

David Garrett
Headquarters, Washington, D.C.
(Phone: 202/755-3090)

RELEASE NO: 78-3

ATLAS-CENTAUR FAILURE BOARD OF INQUIRY REPORTS

A NASA Board of Inquiry has issued its final report on the failure of an Atlas-Centaur launch vehicle which occurred Sept. 29, 1977. Launched from NASA's Kennedy Space Center, Fla., the vehicle with an Intelsat IV-A spacecraft aboard was destroyed 55 seconds into the flight.

The Board of Inquiry determined that the cause of the Atlas-Centaur failure was a rupture in the high-pressure "omega joint" in the Atlas stage booster gas generator discharge line. The fault occurred as a result of corrosion following carbon contamination during brazing in the production cycle.

-more-

January 5, 1978

Since the fault was a processing failure, not a design problem, the joints on all other completed vehicles were tested. All vehicles now at the Kennedy Center passed the test, but a few omega joints in the factory were corroded or questionable, and are being replaced.

In the future, fabrication of this joint and others like it using the same stainless material will be processed in a manner which prevents contamination.

The next launch of an Atlas-Centaur with another Intelsat IV-A satellite aboard is scheduled Friday, Jan. 6, from Kennedy Space Center. The launch window extends from 7:19 until 9:13 p.m. EST.

-end-

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APA-3 — (2)

For Release

Immediate

Miles Waggoner
Headquarters, Washington, D.C.
(Phone: 202/755-8341)

RELEASE NO: 78-4

CHAPMAN HEADS NASA EXTERNAL RELATIONS

Kenneth R. Chapman has been named NASA's Associate Administrator for External Relations, effective Jan. 8, 1978.

Chapman has been acting as the Associate Administrator for External Relations since that position was created Nov. 8, 1977. He previously held the position of Assistant Administrator for DOD and Interagency Affairs since joining NASA April 1, 1977.

As Associate Administrator for External Relations, Chapman will be the senior policy official responsible for integrating NASA's activities in the areas of public, legislative, university, community, interagency and international affairs.

-more-

Mailed:
January 9, 1978

Chapman came to NASA from the Nuclear Regulatory Commission, where he had been the Director, Office of Nuclear Material Safety and Safeguards since he retired after a 29-year career from the Air Force in 1975.

A native of Summerfield, Kan., Chapman attended Kansas State University, Manhattan, Kan., from 1941 to 1943; entered the United States Military Academy at West Point, N.Y., in June 1943; and graduated in June 1946 as a second lieutenant with a pilot rating. In 1952 he entered the University of California at Berkeley and in 1954 received a master of science degree in nuclear chemistry. During 1963 he attended the Armed Forces Staff College at Norfolk, Va., and graduated from the Industrial College of the Armed Forces, Washington, D.C., in 1966.

Chapman is married to the former Mary Monroe of Enterprise, Kan. They have two children: Margaret Ann and David Monroe.

-end-

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For Release
IMMEDIATE

RELEASE NO: 78-5

<u>NOTE TO EDITORS</u>:

A symposium to consider the proper role NASA should be prepared to fulfill during the early to mid-1980s has been scheduled for Jan. 16 and 17 in Washington, D.C.

NASA has requested Courtland D. Perkins, President of the National Academy of Engineering, to organize and chair the sessions. Twenty nationally-known authorities in fields including federal research policy, economics, education, science, aircraft development and space applications will participate and contribute their views on the subject.

The symposium is being held in connection with an assessment of its institutional base currently being conducted within NASA.

-more-

The group will meet on Jan. 16 and 17 at the National Academy of Sciences building, 2101 Constitution Ave., N.W., Washington, D.C. 20418. The session on the 16th will be held in Room 150 (seating capacity about 50) starting at 9:30 a.m. The session on the 17th will be held in the board room (seating capacity about 44) starting at 9:00 a.m. The symposium is open to the public, up to the listed seating capacities (which include invited participants in both cases).

Although the schedule does not permit active participation during the meetings by members of the public, individuals interested in submitting their views on this subject may do so in writing at any time up to close of business, Jan. 20, 1978. Written views, or inquiries on this subject should be directed to:

Courtland D. Perkins
President
National Academy of Engineering
2101 Constitution Avenue, NW
Washington, DC 20418

Those invited to the symposium are:

Courtland D. Perkins
National Academy of Egineering

Raymond Bosplinghoff
Tyco Laboratories
Exeter, N.H.

Arthur E. Bryson, Jr.
Stanford University
Stanford, Calif.

Willis Hawkins
Lockheed Aircraft Corp.
Burbank, Calif.

-more-

Jack L. Kerrebrock
Massachusetts Institute of Technology
Cambridge, Mass.

Richard J. Coar
Pratt & Whitney Aircraft
East Hartford, Conn.

A.G. W. Cameron
Harvard College Observatory
Cambridge, Mass.

Herbert Friedman
Naval Research Laboratory
Washington, D.C.

Daniel J. Fink
Space Division
General Electric Co.
Philadelphia, Pa.

Robert M. White
National Research Council
Washington, D.C.

Jack M. Campbell
Campbell, Bingaman & Black, P.A.
Santa Fe, N. Mex.

Alexander H. Flax
Institute for Defense Analyses
Arlington, Va.

Eberhardt Rechtin
The Aerospace Corp.
El Segundo, Calif.

Paul O'Neill
International Paper Co.
New York, N.Y.

John L. McLucas
Comsat General Corp.
Washington, D.C.

G.S. Schairer
The Boeing Co.
Seattle, Wash.

H. Guyford Stever
Consultant
Washington, D.C.

J.N. Krebs
General Electric Co.
Lynn, Mass.

Donald Hornig
Harvard School
of Health
Boston, Mass.

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For Release:

IMMEDIATE

Kenn Morris
Headquarters, Washington, D.C.
(Phone: 202/755-3897)

Dick McCormack
Headquarters, Washington, D.C.
(Phone: 202/755-8583)

RELEASE NO: 78-6

INDIA TO BUILD A LANDSAT GROUND STATION

India plans to build a Landsat ground station designed to receive data directly from NASA's Earth resources satellites under a recently concluded agreement between the United States and India.

The new ground station, to be built and operated by the Indian National Remote Sensing Agency (NRSA) at Hyderabad in the south central Indian state of Andhra Pradesh, will be capable of receiving, processing and disseminating data covering all India and much of the surrounding region.

-more-

Mailed:
January 13, 1978

The agreement was signed by U.S. Secretary of State Cyrus R. Vance, and India's Minister of External Affairs, Atal Bihari Vajpayee. Establishment of the Hyderabad station will facilitate sharing by Indian and neighboring countries of the practical benefits of satellite remote sensing technology. These benefits include the capability to regularly monitor land cover and geological features as well as to observe the constantly changing condition of agricultural, water and other natural resources.

The agreement requires NRSA to make copies of Landsat data available to anyone requesting data of the region. NRSA has also agreed to share the cost of operating the Landsat satellites by paying NASA the annual access fee beginning after the first six months the Hyderabad station begins receiving data.

The Hyderabad station will be capable of receiving data from the currently operating Landsat-2 as well as Landsat-C, scheduled for launch in March, and Landsat-D, scheduled for launching in 1981. Four Landsat ground stations are already in operation outside the U.S.: at Prince Albert, Saskatchewan and Shoe Cove, Newfoundland, Canada; Cuiaba, Brazil; and Fucino, Italy. Iran will begin receiving Landsat data from facilities near Tehran later this year.

-more-

Chile, Zaire and Argentina have signed agreements to build their own Landsat stations.

U.S. ground stations for Landsat are located at Fairbanks, Alaska; Goldstone, Calif.; and at NASA's Goddard Space Flight Center, Greenbelt, Md.

Landsat data has been used by hundreds of scientists and local officials in the U.S. and more than 100 foreign countries use wide-ranging programs to develop and encourage further applications of satellite remote sensing techniques.

Data has been purchased by scientists in more than 100 countries from the U.S. Department of Interior's Earth Resources Observations Systems (EROS) Data Center in Sioux Falls, S.D. More than 120,000 separate views of the Earth from NASA's Landsats have been provided to the EROS Data Center, where both independent scientists and the general public may obtain material for a nominal fee.

-end-

NASA News

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Dave Garrett
Headquarters, Washington, DC
(Phone: 202/755-3090)

For Release:

1 p.m. Monday,
January 16, 1978

RELEASE NO: 78-7

NASA SELECTS 35 ASTRONAUT CANDIDATES

NASA Administrator, Dr. Robert A. Frosch, today announced the selection of 35 new astronaut candidates for the Space Shuttle program.

This group of candidates will report to Johnson Space Center on July 1, 1978. There they will join the astronauts currently on flight status.

In making the announcement, Dr. Frosch said: "The long and difficult task of selecting the most qualified candidates for the Space Shuttle program has been concluded and we are very pleased with the results. We have selected an outstanding group of women and men who represent the most competent, talented and experienced people available to us today."

NASA received 8,079 applications during a year-long recruiting period which ended June 30, 1977.

- more -

Since August, 208 finalists have been interviewed and have undergone medical examinations at NASA's Johnson Space Center, Houston, Tex.

After two years of training and evaluation at the Johnson Space Center, successful candidates will become astronauts and enter the Shuttle training program leading to selection on a Space Shuttle flight crew.

Pilots will operate the Space Shuttle Orbiter, maneuvering it in Earth orbit and flying it to Earth for a runway landing.

Mission specialist astronauts will have the overall responsibility for the coordination, with the commander and pilot, of Space Shuttle operations in the areas of crew activity planning, consumables usage, and other Space Shuttle activities affecting experiment operations. They may participate in extravehicular activities (space walks), perform special payload handling or maintenance operations using the Space Shuttle remote manipulator system, and assist in specific experiment operation at the discretion of the experiment sponsor.

The newly selected candidates include 14 civilians and 21 military officers. Of the group, six are women, and four are minorities. There are currently 27 astronauts on active status (17 pilots and 10 scientist astronauts) and one on leave of absence.

A list of the new astronaut candidates is attached.

- end -

ASTRONAUT CANDIDATES

Bluford, Guion S.	US Air Force	Mission Specialist
Brandenstein, Daniel C.	US Navy	Pilot
Buchli, James F.	US Marine Corps.	Mission Specialist
Coats, Michael L.	US Navy	Pilot
Covey, Richard O.	US Air Force	Pilot
Creighton, John O.	US Navy	Pilot
Fabian, John M.	US Air Force	Mission Specialist
Fisher, Anna L.	Civilian	Mission Specialist
Gardner, Dale A.	US Navy	Mission Specialist
Gibson, Robert L.	US Navy	Pilot
Gregory, Frederick D.	US Air Force	Pilot
Griggs, Stanley D.	Civilian	Pilot
Hart, Terry J.	Civilian	Mission Specialist
Hauck, Frederick H.	US Navy	Pilot
Hawley, Steven A.	Civilian	Mission Specialist
Hoffman, Jeffrey A.	Civilian	Mission Specialist
Lucid, Shannon W.	Civilian	Mission Specialist
McBride, Jon A.	US Navy	Pilot
McNair, Ronald E.	Civilian	Mission Specialist
Mullane, Richard M.	US Air Force	Mission Specialist
Nagel, Steven R.	US Air Force	Pilot
Nelson, George D.	Civilian	Mission Specialist
Onizuka, Ellison S.	US Air Force	Mission Specialist
Resnik, Judith A.	Civilian	Mission Specialist
Ride, Sally K.	Civilian	Mission Specialist
Scobee, Francis R.	US Air Force	Pilot
Seddon, Margaret R.	Civilian	Mission Specialist
Shaw, Brewster H., Jr.	US Air Force	Pilot
Shriver, Loren J.	US Air Force	Pilot
Stewart, Robert L.	US Army	Mission Specialist
Sullivan, Kathryn D.	Civilian	Mission Specialist
Thagard, Norman E.	Civilian	Mission Specialist
van Hoften, James D.	Civilian	Mission Specialist
Walker, David M.	US Navy	Pilot
Williams, Donald E.	US Navy	Pilot

NAME: Guion S. Bluford, Jr., MAJ, US Air Force (PhD)

BIRTH DATE AND PLACE: November 22, 1942 Philadelphia, PA

CURRENT RESIDENCE: Dayton, OH

EDUCATION: Overbrook Senior High School, Philadelphia, PA
BS, Aerospace Engineering, Pennsylvania State Univ., 1964
MS, Aerospace Engineering, Air Force Institute of Technology, 1974
PhD, Aerospace Engineering, Air Force Institute of Technology, 1977

MARITAL STATUS: Married to the former Linda M. Tull of Philadelphia, PA

CHILDREN: Two

PRESENT POSITION: Chief, Aerodynamics and Airframe Branch
Aeromechanics Division, Air Force Dynamics Lab.
Wright-Patterson AFB, OH 45433

PARENTS: Father: (Deceased)
Mother: Lolita B. Bluford of Philadelphia, PA

NAME: Daniel C. Brandenstein, LCDR, US Navy

BIRTH DATE AND PLACE: January 17, 1943 Watertown, WI

CURRENT RESIDENCE: Oak Harbor, WA

EDUCATION: Watertown High School, Watertown, WI
BS, Mathematics/Physics, University of Wisconsin, 1965

MARITAL STATUS: Married to the former Jane A. Wade of Amery, WI

CHILDREN: One

PRESENT POSITION: Naval Aviator and Maintenance Officer
Attack Squadron One Four Five
NAS Whidbey Island, Oak Harbor, WA 98278

PARENTS: Mr. and Mrs. Walter Brandenstein of Watertown, WI

NAME: James F. Buchli, CAPT, US Marine Corps.

BIRTH DATE AND PLACE: June 20, 1945 New Rockford, SD

CURRENT RESIDENCE: Lexington Park, MD

EDUCATION: Fargo Central High School, Fargo, ND
BS, US Naval Academy, 1967
MS, Aeronautical Systems, University of West Florida, 1975

MARITAL STATUS: Married to the former Sandra J. Oliver

CHILDREN: Two

PRESENT POSITION: Student
U. S. Naval Flight Test Engineering School
Patuxent River, MD 20670

PARENTS: Mr. and Mrs. Martin A. Buchli of Fargo, ND

NAME: Michael L. Coats, LCDR, US Navy

BIRTH DATE AND PLACE: January 16, 1946 Sacramento, CA

CURRENT RESIDENCE: Great Mills, MD

EDUCATION: Ramona High School, Riverside, CA
BS, US Naval Academy, 1968
MS, Admin. of Science & Technology, George Washington University, 1977

MARITAL STATUS: Married to the former Diane E. Carson of Oklahoma City, OK

CHILDREN: One

PRESENT POSITION: Student
U. S. Navy Postgraduate School
Monterey, CA

PARENTS: Mr. and Mrs. Loyd A. Coats of Fort Collins, CO

NAME: Richard O. Covey, MAJ, US Air Force

BIRTH DATE AND PLACE: August 1, 1946 Fayetteville, AR

CURRENT RESIDENCE: Fort Walton Beach, FL

EDUCATION: Choctawhatchee High School, Shalimar, FL
BS, US Air Force Academy, 1968
MS, Aeronautical/Astronautical Engineering, Purdue University, 1969

MARITAL STATUS: Married to the former Kathleen Allbaugh of Indianola, IA

CHILDREN: Two

PRESENT POSITION: Commander, F-15 Joint Test Force
Air Force Test Center Detachment 2
Eglin AFB, FL 32542

PARENTS: Mr. and Mrs. Charles D. Covey of Fort Walton Beach, FL

NAME: John O. Creighton, LCDR, US Navy

BIRTH DATE AND PLACE: April 28, 1943 Orange, TX

CURRENT RESIDENCE: Lexington Park, MD

EDUCATION: Ballard High School, Seattle, WA
BS, US Naval Academy, 1966

MARITAL STATUS: Unmarried

CHILDREN: None

PRESENT POSITION: Test Pilot
Naval Air Test Center
Patuxent River, MD 20670

PARENTS: Mr. and Mrs. Wilbur O. Creighton of Seattle, WA

NAME: John M. Fabian, MAJ, US Air Force (PhD)

BIRTH DATE AND PLACE: January 28, 1939 Goosecreek, TX

CURRENT RESIDENCE: Colorado Springs, CO

EDUCATION: Pullman High School, Pullman, WA
BS, Mechanical Engineering, Washington State University, 1962
MS, Aerospace Engineering, Air Force Institute of Technology, 1964
PhD, Aeronautics/Astronautics, University of Washington, 1974

MARITAL STATUS: Married to the former Donna K. Buboltz of Lewiston, ID

CHILDREN: Two

PRESENT POSITION: Assistant Professor of Aeronautics
US Air Force Academy, CO 80840

PARENTS: Mr. and Mrs. Felix M. Fabian, Sr. of Corpus Christi, TX

NAME: Anna L. Fisher, MD

BIRTH DATE AND PLACE: August 24, 1949 Albany, NY

CURRENT RESIDENCE: Rancho Palos Verdes, CA

EDUCATION: San Pedro High School, San Pedro, CA
BS, Chemistry, University of California, Los Angeles, 1971
MD, University of California, Los Angeles, School of Medicine, 1976

MARITAL STATUS: Married to Dr. William F. Fisher of Dallas, TX

CHILDREN: None

PRESENT POSITION: Physician
Los Angeles, CA

PARENTS: Mr. and Mrs. Riley F. Tingle of San Pedro, CA

NAME: Dale A. Gardner, LT, US Navy

BIRTH DATE AND PLACE: November 8, 1948 Fairmont, MN

CURRENT RESIDENCE: Camarillo, CA

EDUCATION: Savanna Community High School, Savanna, IL
BS, Engineering Physics, University of Illinois, 1970

MARITAL STATUS: Married to the former Sue G. Ticusan of Indianapolis, IN

CHILDREN: None

PRESENT POSITION: Naval Flight Officer
Air Test and Evaluation Squadron Four
NAS Point Mugu, CA 93042

PARENTS: Mr. and Mrs. William R. Gardner of Clinton, IA

NAME: Robert L. Gibson, LT, US Navy

BIRTH DATE AND PLACE: October 30, 1946 Cooperstown, NY

CURRENT RESIDENCE: Leonardtown, MD

EDUCATION: Huntington High School, Huntington, NY
BS, Aeronautical Engineering, California Polytechnic State University, 1969

MARITAL STATUS: Married to the former Cathy M. Von Epps of Santa Barbara, CA

CHILDREN: One

PRESENT POSITION: Test Pilot
Naval Air Test Center
Patuxent River, MD 20670

PARENTS: Mr. and Mrs. Paul A. Gibson of Westminister, CA

NAME: Frederick D. Gregory, MAJ, US Air Force

BIRTH DATE AND PLACE: January 7, 1941 Washington, DC

CURRENT RESIDENCE: Hampton, VA

EDUCATION: Anacostia High School, Washington, DC
BS, US Air Force Academy, 1964
MS, Information Systems, George Washington Univ., 1977

MARITAL STATUS: Married to the former Barbara A. Archer of Newport News, VA

CHILDREN: Two

PRESENT POSITION: Armed Forces Staff College
Norfolk, VA 23511

PARENTS: Father: (Deceased)
Mother: Nora D. Gregory of Washington, DC

NAME: Stanley D. Griggs

BIRTH DATE AND PLACE: September 7, 1939 Portland, OR

CURRENT RESIDENCE: Seabrook, TX

EDUCATION: Lincoln High School, Portland, OR
BS, US Naval Academy, 1962
MSA, Management Engineering, George Washington Univ.,1970

MARITAL STATUS: Married to the former Karen F. Kreeb of
Port Jefferson, NY

CHILDREN: Two

PRESENT POSITION: Chief, Shuttle Training Aircraft
Operations Office
NASA/Johnson Space Center
Houston, TX 77058

PARENTS: Mr. and Mrs. Jack L. Griggs of Deerfield, IL

NAME: Terry J. Hart

BIRTH DATE AND PLACE: October 27, 1946 Pittsburgh, PA

CURRENT RESIDENCE: Long Valley, NJ

EDUCATION: Mt. Lebanon High School, Pittsburgh, PA
BS, Mechanical Engineering, Lehigh University, 1968
MS, Mechanical Engineering, Massachusetts Institute of Technology, 1969

MARITAL STATUS: Married to the former Wendy M. Eberhardt of Warren, PA

CHILDREN: One

PRESENT POSITION: Technical Staff Member
Bell Telephone Laboratories
Whippany, NJ 07981

PARENTS: Father: Jonathan S. Hart of Somers Point, NJ
Mother: Lillian H. Hufnagel of Delray Beach, FL

NAME: Frederick H. Hauck, CDR, US Navy

BIRTH DATE AND PLACE: April 11, 1941 Long Beach, CA

CURRENT RESIDENCE: Oak Harbor, WA

EDUCATION: St. Albans High School, Mt. St. Alban, Washington, DC
BS, General Physics, Tufts University, 1962
MS, Nuclear Engineering, Massachusetts Institute of Technology, 1966

MARITAL STATUS: Married to the former Mary E. Bowman of Washington, DC

CHILDREN: Two

PRESENT POSITION: Executive Officer
Attack Squadron One Four Five
NAS Whidbey Island, Oak Harbor, WA 78278

PARENTS: Father: (Deceased)
Mother: Virginia H. Hauck of Winchester, MA

NAME: Steven A. Hawley, PhD

BIRTH DATE AND PLACE: December 12, 1951 Ottawa, KS

CURRENT RESIDENCE: Santa Cruz, CA

EDUCATION: Salina Central High School, Salina, KS
BA, Astronomy and Physics, University of Kansas, 1973
PhD, Astronomy, University of California, Santa Cruz, 1977

MARITAL STATUS: Unmarried

CHILDREN: None

PRESENT POSITION: Postdoctoral Research Associate
Cerro Tololo Inter-American Observatory
La Serena, Chile

PARENTS: Mr. and Mrs. Bernard R. Hawley of Salina, KS

NAME: Jeffrey A. Hoffman, PhD

BIRTH DATE AND PLACE: November 2, 1944 New York, NY

CURRENT RESIDENCE: Weston, MA

EDUCATION: Scarsdale High School, Scarsdale, NY
BA, Astronomy, Amherst College, 1966
PhD, Astrophysics, Harvard University, 1971

MARITAL STATUS: Married to the former Barbara C. Attridge of London, England

CHILDREN: One

PRESENT POSITION: Astrophysics Research Staff
Massachusetts Institute of Technology
Center for Space Research
Cambridge, MA 02139

PARENTS: Mr. and Mrs. Burton P. Hoffman of Scarsdale, NY

NAME: Shannon W. Lucid, PhD

BIRTH DATE AND PLACE: January 14, 1943 Shanghai, China

CURRENT RESIDENCE: Oklahoma City, OK

EDUCATION: Bethany High School, Bethany, OK
BS, Chemistry, University of Oklahoma, 1963
MS, Biochemistry, University of Oklahoma, 1970
PhD, Biochemistry, University of Oklahoma, 1973

MARITAL STATUS: Married to Michael F. Lucid of Indianapolis, IN

CHILDREN: Three

PRESENT POSITION: Postdoctoral Fellow
Oklahoma Medical Research Foundation
Oklahoma City, OK 73104

PARENTS: Mr. and Mrs. Joseph O. Wells of Bethany, OK

NAME: Jon A. McBride, LCDR, US Navy

BIRTH DATE AND PLACE: August 14, 1943 Charleston, WV

CURRENT RESIDENCE: Point Mugu, CA

EDUCATION: Woodrow Wilson High School, Beckley, WV
BS, Aeronautical Engineering, US Navy Postgraduate School, 1971

MARITAL STATUS: Married to the former Brenda L. Stewart of Bayou La Batre, LA

CHILDREN: Three

PRESENT POSITION: Test Pilot
Air Test and Evaluation Squadron Four
Point Mugu, CA 93042

PARENTS: Mr. and Mrs. William L. McBride of Waynesboro, VA

NAME: Ronald E. McNair, PhD

BIRTH DATE AND PLACE: October 21, 1950 Lake City, SC

CURRENT RESIDENCE: Marina Del Rey, CA

EDUCATION: Carver High School, Lake City, SC
BS, Physics, North Carolina A & T University, 1971
PhD, Physics, Massachusetts Institute of Technology, 1977

MARITAL STATUS: Married to the former Cheryl B. Moore, of Brooklyn, NY

CHILDREN: None

PRESENT POSITION: Member of the Technical Staff, Optical Physics Department
Hughes Research Laboratories
Malibu, CA 90265

PARENTS: Father: Carl C. McNair of New York, NY
Mother: Pearl M. McNair of Lake City, SC

NAME: Richard M. Mullane, CAPT, US Air Force

BIRTH DATE AND PLACE: September 10, 1945 Wichita Falls, TX

CURRENT RESIDENCE: Fort Walton Beach, FL

EDUCATION: St. Pius X High School, Albuquerque, NM
BS, U. S. Military Academy, 1967
MS, Aeronautical Engineering, Air Force Institute of Technology, 1975

MARITAL STATUS: Married to the former Donna M. Sei of Albuquerque, NM

CHILDREN: Three

PRESENT POSITION: Flight Test Weapon Systems Operator
3246th Test Wing
Eglin AFB, FL 32542

PARENTS: Mr. and Mrs. Hugh J. Mullane of Albuquerque, NM

NAME: Steven R. Nagel, CAPT, US Air Force

BIRTH DATE AND PLACE: October 27, 1946 Canton, IL

CURRENT RESIDENCE: Edwards, CA

EDUCATION: Canton High School, Canton, IL
BS, Aeronautical/Astronautical Engineering
University of Illinois, 1969

MARITAL STATUS: Married to the former Linda D. Penney of
Los Angeles, CA

CHILDREN: None

PRESENT POSITION: Test Pilot
Air Force Flight Test Center
Edwards AFB, CA 93523

PARENTS: Mr. and Mrs. Ivan R. Nagel of Canton, IL

NAME: George D. Nelson, PhD

BIRTH DATE AND PLACE: July 13, 1950 Charles City, IA

CURRENT RESIDENCE: Seattle, WA

EDUCATION: Willmar Senior High School, Willmar, MN
BS, Physics, Harvey Mudd University, 1972
MS, Astronomy, University of Washington, 1974
PhD, Astronomy, University of Washington, 1977

MARITAL STATUS: Married to the former Susan L. Howard of Alhambra, CA

CHILDREN: Two

PRESENT POSITION: Research Associate, Astronomy Department
University of Washington
Seattle, WA 98195

PARENTS: Mr. and Mrs. George V. Nelson of Clinton, IA

NAME: Ellison S. Onizuka, CAPT, US Air Force

BIRTH DATE AND PLACE: June 24, 1946   Kealakekua, HI

CURRENT RESIDENCE: Edwards AFB, CA

EDUCATION: Konawaena High School, Kealakekua, HI
BS, Aerospace Engineering, University of Colorado, 1969
MS, Aerospace Engineering, University of Colorado, 1969

MARITAL STATUS: Married to the former Lorna L. Yoshida of
Pahala, HI

CHILDREN: Three

PRESENT POSITION: Chief, Engineering Support Section
Training Resources Branch
USAF Test Pilot School
Edwards AFB, CA 93523

PARENTS: Father: (Deceased)
Mother: Mitsue Onizuka of Holualoa, HI

NAME: Judith A. Resnik, PhD

BIRTH DATE AND PLACE: April 5, 1949 Akron, OH

CURRENT RESIDENCE: Redondo Beach, CA

EDUCATION: Firestone High School, Akron, OH
BS, Electrical Engineering, Carnegie-Mellon Univ., 1970
PhD, Electrical Engineering, University of Maryland, 1977

MARITAL STATUS: Unmarried

CHILDREN: None

PRESENT POSITION: Engineering Staff, Product Development
Xerox Corporation
El Segundo, CA 90245

PARENTS: Father: Marvin Resnik of Akron, OH
Mother: Sarah Polen of Mayfield Heights, OH

NAME: Sally K. Ride

BIRTH DATE AND PLACE: May 26, 1951 Los Angeles, CA

CURRENT RESIDENCE: Stanford, CA

EDUCATION: Westlake High School, Los Angeles, CA
BS, Physics, Stanford University, 1973
BA, English, Stanford University, 1973
MS, Physics, Stanford University, 1975

MARITAL STATUS: Unmarried

CHILDREN: None

PRESENT POSITION: Research Assistant, Physics Department
Stanford University
Stanford, CA 94305

PARENTS: Mr. and Mrs. Dale B. Ride of Encino, CA

NAME: Francis R. Scobee, MAJ, US Air Force

BIRTH DATE AND PLACE: May 19, 1939 Cle Elum, WA

CURRENT RESIDENCE: Edwards AFB, CA

EDUCATION: Auburn High School, Auburn, WA
BS, Aerospace Engineering, University of Arizona, 1965

MARITAL STATUS: Married to the former Virginia J. Kent of Birmingham, AL

CHILDREN: Two

PRESENT POSITION: Test Pilot
Air Force Flight Test Center
Edwards AFB, CA 93523

PARENTS: Mr. and Mrs. Francis W. Scobee of Auburn, WA

NAME: Margaret R. Seddon, MD

BIRTH DATE AND PLACE: November 8, 1947 Murfreesboro, TN

CURRENT RESIDENCE: Memphis, TN

EDUCATION: Central High School, Murfreesboro, TN
BA, Physiology, University of California, Berkeley, 1970
MD, University of Tennessee College of Medicine, 1973

MARITAL STATUS: Unmarried

CHILDREN: None

PRESENT POSITION: Resident Physician, Department of Surgery
City of Memphis Hospital
Memphis, TN 38103

PARENTS: Father: Edward C. Seddon of Murfreesboro, TN
Mother: (Deceased)

NAME: Brewster H. Shaw, Jr., CAPT, US Air Force

BIRTH DATE AND PLACE: May 16, 1945 Cass City, MI

CURRENT RESIDENCE: Edwards, CA

EDUCATION: Cass City High School, Cass City, MI
BS, Engineering Mechanics, University of Wisconsin, 1968
MS, Engineering Mechanics, University of Wisconsin, 1969

MARITAL STATUS: Married to the former Kathleen A. Mueller of Madison, WI

CHILDREN: Three

PRESENT POSITION: Instructor
U. S. Air Force Test Pilot School
Edwards AFB, CA 93523

PARENTS: Mr. and Mrs. Brewster H. Shaw of Cass City, MI

NAME: Loren J. Shriver, CAPT, US Air Force

BIRTH DATE AND PLACE: September 23, 1944 Jefferson, IA

CURRENT RESIDENCE: Edwards AFB, CA

EDUCATION: Paton Consolidated High School, Paton, IA
BS, US Air Force Academy, 1967
MS, Astronautics, Purdue University, 1968

MARITAL STATUS: Married to the former Susan D. Hane of Jefferson, IA

CHILDREN: Four

PRESENT POSITION: Test Pilot
Air Force Flight Test Center
Edwards AFB, CA 93523

PARENTS: Mr. and Mrs. Darrell R. Shriver of Paton, IA

NAME: Robert L. Stewart, MAJ, US Army

BIRTH DATE AND PLACE: August 13, 1942 Washington, DC

CURRENT RESIDENCE: Edwards, CA

EDUCATION: Hattiesburg High School, Hattiesburg, MS
BS, Mathematics, University of Southern Mississippi, 1964
MS, Aerospace Engineering, University of Texas, Arlington, 1971

MARITAL STATUS: Married to the former Mary J. Murphy of La Grange, GA

CHILDREN: Two

PRESENT POSITION: Test Pilot
U. S. Army Aviation Engineering Flight Activity
Edwards AFB, CA 93523

PARENTS: Mr. and Mrs. Lee O. Stewart of Waverly Hall, GA

NAME: Kathryn D. Sullivan

BIRTH DATE AND PLACE: October 3, 1951 Paterson, NJ

CURRENT RESIDENCE: Halifax, Nova Scotia, Canada

EDUCATION: Taft High School, Woodland Hills, CA
BS, Earth Sciences, University of California,
Santa Cruz, 1973

MARITAL STATUS: Unmarried

CHILDREN: None

PRESENT POSITION: Postgraduate Student
National Research Council, Dalhousie University
Halifax, Nova Scotia, Canada

PARENTS: Mr. and Mrs. Donald P. Sullivan of Cupertino, CA

Miss Sullivan will receive her PhD in geology from the University of Dalhousie in April 1978. She does not have a master's degree.

NAME: Norman E. Thagard, MD

BIRTH DATE AND PLACE: July 3, 1943 Marianna, FL

CURRENT RESIDENCE: James Island, SC

EDUCATION: Paxon High School, Jacksonville, FL
BS, Engineering Science, Florida State University, 1965
MS, Engineering Science, Florida State University, 1966
MD, University of Texas Southwestern Medical School, 1977

MARITAL STATUS: Married to the former Rex K. Johnson of Atlanta, GA

CHILDREN: Two

PRESENT POSITION: Intern, Department of Internal Medicine
Medical University of South Carolina
Charleston, SC

PARENTS: Father: James E. Thagard of Palm Desert, CA
Mother: Mary F. Nicholson of St. Petersburg, FL

NAME: James D. van Hoften, PhD

BIRTH DATE AND PLACE: June 11, 1944 Fresno, CA

CURRENT RESIDENCE: Houston, TX

EDUCATION: Mills High School, Millbrae, CA
BS, Civil Engineering, University of California, Berkeley, 1966
MS, Hydraulic Engineering, Colorado State University, 1968
PhD, Fluid Mechanics, Colorado State University, 1976

MARITAL STATUS: Married to the former Vallarie Davis of Pasadena, CA

CHILDREN: Two

PRESENT POSITION: Assistant Professor of Civil Engineering
University of Houston
Houston, TX 77004

PARENTS: Mr. and Mrs. Adriaan van Hoften of Redwood City, CA

NAME: Donald E. Williams, LCDR, US Navy

BIRTH DATE AND PLACE: February 13, 1942 Lafayette, IN

CURRENT RESIDENCE: Lemoore, CA

EDUCATION: Otterbein High School, Otterbein, IN
BS, Mechanical Engineering, Purdue University, 1964

MARITAL STATUS: Married to the former Linda J. Grubaugh of Sturgis, MI

CHILDREN: Two

PRESENT POSITION: Naval Aviator
Readiness Training Squadron
NAS Lemoore, CA 93245

PARENTS: Mr. and Mrs. Robert E. Williams of Lafayette, IN

NAME: David M. Walker, LCDR, US Navy

BIRTH DATE AND PLACE: May 20, 1944 Columbus, GA

CURRENT RESIDENCE: Virginia Beach, VA

EDUCATION: Eustis High School, Eustis, FL
BS, US Naval Academy, 1966

MARITAL STATUS: Married to the former Patricia A. Shea

CHILDREN: Two

PRESENT POSITION: Naval Aviator
VF-142 (USS America)
FPO New York 09501

PARENTS: Father: (Deceased)
Mother: Anne W. Rundle of Boston, MA

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

SPACE SHUTTLE ASTRONAUTS

PRESS CONFERENCE

1:00 P. M.
16 January 1978
6104/Auditorium
400 Maryland Avenue
Washington, D. C.

PARTICIPANTS

Mr. Robert Newman
Director of Public Affairs
NASA

Dr. Robert A. Frosch
NASA Administrator

Dr. Alan Lovelace
Deputy Administrator
NASA

Dr. Christopher C. Kraft
Director
Johnson Space Center
Houston, Texas

P R O C E E D I N G S

MR. NEWMAN: Good afternoon. Let me welcome you to the press conference to announce NASA's selection of a new group of astronaut candidates. My name is Bob Newman, and I am Director of Public Affairs for NASA. Press kits are in the back if some of you have not picked them up. Let me just give you a moment or two here about the format and then we will get on with it.

In a few moments I will introduce Dr. Robert A. Frosch, NASA Administrator. He is going to make a brief statement. Afterwards he will be joined up front at the table for questions by Dr. Alan M. Lovelace, the Deputy Administrator, and Dr. Christopher C. Kraft the Director of the Johnson Space Center in Houston.

I might add that this conference is being carried live to all NASA Field Centers, and with the Johnson Space Center in Houston we have a two-way circuit so that the news media there can also ask questions. So at this point I would like to introduce Dr. Frosch.

DR. FROSCH: Thank you, Bob. Good afternoon. We have completed the long and difficult task of selecting the most qualified new candidates of the Space Shuttle Program, and we are pleased with the results. We have selected an outstanding group of men and women who represent the most competent, talented and experienced people available to us today. I would like to thank the Board that spent a tremendous amount of time and effort, over a year and a half, in looking at the qualifications of candidates, making decisions, interviewing candidates, making more decisions, discussing the characteristics of people, the characteristics of the job to be done, and finally, presenting recommendations.

I would also like to thank the more than 8,000 people who applied to become astronauts, for their time, their interest, their effort.

Originally, as you know, we intended to announce names by the end of December, but we delayed a couple of weeks. We got the list of recommendations from the Board on the 12th of December, and I began to review the process myself so that I could understand the process and the candidates, discuss this with Chris Kraft in an attempt to understand the whole business and all the characteristics and the process that went into the selection.

We completed the review after the end of the year, got a final list of 35 from Chris Kraft last week, and I gave a final okay on the 12th of January.

The 35 selectees are in the process of being notified. We started at seven o'clock this morning by telephone, and mailgram. I understand that 34 out of the 35 have been reached and have accepted. The 35th is on a ship at sea and has not yet been contacted.

There will be an orientation meeting for the astronaut-candidates at the Johnson Space Center later this month. They will arrive there on the evening of the 30th, and will be in meetings on the 31st and the 1st of February, and sometime during that period, will be available for a press conference.

They will arrive at Johnson for the beginning of training, about the first of July this year.

That is all the statement that I want to make at this time. You have in your press kits the list of names, I believe, and I will not take your time by reading that list as you have it. I would suggest that Dr. Lovelace and Dr. Kraft join me at the table at the front of the room, and we open ourselves to questions.

MR. NEWMAN: While we are getting set up here, just a couple of procedural notes. When you have questions, please state your name and your media affiliation. That is for our network, and that is also for our tape recorders, and if you would also please wait for the microphone that is going to be brought around, why that also would be helpful.

So we are all set up. Who has the first question? Yes sir?

MR. COVAULT: Craig Covault with Aviation Week. I see on the breakdown you have Board recommended, 19 military, selected 14 military. Can you explain the 19 versus 14 there?

DR. FROSCH: Yes, when we came to look at the lists and the situation, we examined, among other things, the number of astronaut-candidates we wanted. As you will recall, we had announced that we would select something between 15 and 20, up to 20 really, in the two categories.

We decided that at this point in the process we did not want to select more than 15 in the pilot category. As you know, we have both pilot astronauts and scientist astronauts in the program now. With the addition of the 15 pilots and 20 mission specialists we have total of 32 pilots and 30 scientists or mission specialists. We decided that we would select 15, and then went back through a final selection process.

MR. COVAULT: Bob, did your final cut come when the names reached your level, or was that done at the JSC level? The 19 of 14.

DR. FROSCH: The final cut came after the names reached my level, although the decision to go from 20 to 15 didn't have anything to do with the particular names, but the question of selecting 15 out of 20 was referred back to the Board, finally discussed with Chris Kraft and myself and Alan Lovelace, and Chris forwarded a final proposed list of 15 which I accepted.

MR. NEWMAN: Yes sir?

MR. HINES: Bill Hines from Chicago Sun Times. Two questions about these mission specialists. Is it contemplated that they will be given pilot training, or will they remain non-rated throughout this program?

DR. FROSCH: We have been discussing the question of what I refer to as "cross training" both in terms of giving mission specialists an opportunity to get pilot training, and giving pilots an opportunity to get some mission specialist related training. We have not yet decided exactly what to do. I am inclined to give an opportunity for cross training to those of the candidates who are interested in cross training and who we think, during the course of the full training program would do very well in the cross training.

MR. HINES: Am I correct in my recollection that in all previous classes of astronauts, the idea that they would become rated pilots was primary to their selection, everybody took the training, everybody got rated.

DR. FROSCH: Well, I think everybody will have flying experience, but whether we will go so far as to get the complete ratings is not clear.

MR. HINES: One other question while I have the mike here. The military people, I assume, will be paid at rates commensurate with their military grade. What is going to be the rate of pay for the civilian?

DR. FROSCH: Chris, do you want to comment?

DR. KRAFT: It will be commensurate with their experience level and education, and most of them will be between the 12 and 13 level.

MR. NEWMAN: Yes sir?

MR. LYONS: Lyons, New York Times. Who is the person on the ship?

DR. FROSCH: David Walker.

MR. LYONS: Where is the ship?

DR. FROSCH: I don't know, it is a carrier, but I don't know.

MR. NEWMAN: I heard it was in the Mediterranean. Yes sir, this gentleman here.

MR. DELONG: A couple of questions. Ed Delong with UPI. A couple of questions, one of which is just a rapid follow up to that. What is the name of that carrier, do you know?

MR. NEWMAN: I don't know, we can check it for you.

MR. DELONG: The other question, in as much as the average age of the existing astronauts is something like 43, which is not that far, Dr. Frosch, from your own age, I wonder if you could go into a little more detail into the reason for cutting back on the number of astronauts by a quarter that would be full fledged rated pilots for the 1980's?

DR. FROSCH: Well, we feel that this will give us enough pilots to begin the Shuttle flying, and will give us an opportunity to see whether we have applied the right criteria in the early flying, and give us some chance, if we decide we want to, at a later date, to go back and make an additional selection in that area.

You might say that our experience, pure experience so far, has been that the rate of leaving the astronaut program was higher among the scientist astronauts than among the pilot astronauts, and you can go back and look at the record and so we have balanced them in the current way, but we really do not know what will happen in the course of the next year.

MR. DELONG: Was there in any way any disappointment, or did it play any role that all of them were military personnel, and you would have preferred to have some pilots that were non-military?

DR. FROSCH: No, they weren't all military personnel. There is one civilian in the pilot list, and there are civilians, of course, in the mission specialist list. It was not a question of military versus civilian.

MR. McWETHY: Jack McWethy with U.S. News. Can you tell us who the four minority people are?

DR. FROSCH: Yes. Do you know the names right off?

DR. KRAFT: Gregory, McNair, Bluford, and Onizuka.

SPEAKER: Is it correct to assume that Onizuka is a --

SPEAKER: Excuse me. Onizuka is a Japanese American and the other --

DR. KRAFT: He is from the Hawaiian Islands.

SPEAKER: He is from the Hawaiian Islands, the other three are Black, right?

DR. KRAFT: That is correct.

MR. NEWMAN: Let me just follow up, someone asked about grade levels. GS-12 is $21,800 to $28,400, and GS-13 is $26,000 to $33,800.

Let me ask Hal Stall in Houston, are there any questions down there, Hal?

MR. McLEAISH: Yes, we expect some questions from Houston.

MR. NEWMAN: Hello Houston?

MR. McLEAISH: Hello. Do you copy?

MR. NEWMAN: We hear you. What are the questions.

MR. MC LEAISH: We have a question from Jim Maloney, Houston Post.

MR. MALONEY: Were the five pilots that were eliminated all white males?

DR. FROSCH: Yes, I think so, yes, I think that is right.

MR. NEWMAN: Any more, Houston?

MR. CRIS: Nick Cris with the Los Angeles Times. I have a couple questions while I have the microphone. The first one is directed, I guess, maybe to Chris Kraft, and that is that if all of these astronaut-candidates keep their noses clean, so to say, and go through this two year evaluation period successfully, that does mean that all 35 of them can become bonafide astronauts. Do you expect all of them to make it, in other words?

DR. KRAFT: I wouldn't see any reason why they wouldn't. Certainly all of the people are extremely well qualified. We know from the interviews that they are highly motivated people. A large majority of them have been desirous of being an astronaut since ten or twelve years of age and set out to do so. We think that a high percentage, if not all of them, would make it.

MR. CRIS: My second question is this. I see, according to the list, that you do indeed have several Blacks and you have a Japanese American. You have women, you have Germans, Italians, Swiss, Irish, so forth. I don't see any Hispanic or Spanish surnames and I wondered if you had many such apply or considered?

DR. KRAFT: Yes, if I recall four of them had made the final -- there were four Spanish-speaking Americans, I believe that is the number, that made the final list that we brought in for interviews. Unfortunately, they weren't medically qualified.

MR. NEWMAN: Okay, I will take it back on this end, Hal. Yes sir, the gentleman in the back row?

MR. WALTON: Mark Walton, Independent Television. Gentlemen, are these the first women in the program?

DR. KRAFT: Yes.

MR. WALTON: Okay, my questions are to your experience with women in the selection process and what provisions are there for them in specific training, just a little bit about what has been interesting about them.

DR. FROSCH: Chris?

DR. KRAFT: Well, I think the most rewarding thing was that we found that there are a large number of very highly qualified women in the United States that can make the qualifications that we set out as astronauts. We found that a number of them are fliers, although none of them had experience in high performance airplanes.

We found that, again, a number of those that were selected had prepared themselves to be astronauts. That is what they had set out to do. It just didn't occur to them when we announced that they wanted to be astronauts, that had been their plan.

As to their training, we don't propose that they would get any kind of different training, in general of all of the candidates, with the exception that we hope to maintain the proficiency they have in the fields in which they are trained, so that that allows us the skilled mix that we are looking for in the training of mission specialists.

MR. WALTON: Will they be performing exactly the same missions?

DR. KRAFT: That is hard to say because of the background of these individuals. One of them is in earth sciences, several of them are in life sciences. One is a biochemist. I think that we would choose the mission specialist on the basis of the demands of a particular flight.

On the other hand, because they are very smart people, I don't think that we would have any problem in them carrying out any parts of the mission.

DR. FROSCH: The distinction among missions will be by professional capability.

MR. NEWMAN: Jules?

MR. BERGMAN: Chris, since you have been in the space program longer than Dr. Frosch or Dr. Lovelace I pick on you for this question. Why is it taking so long to have women named to the program, when on Skylab there conceivably could have been room for women scientists?

DR. KRAFT: Well, I think that in the past it has been a matter of qualification of these women, and when we selected the scientist-astronauts before, it was difficult to choose women because of their lack of qualification.

I think that in the last few years in the United States that because of the women's movement, frankly, that women are much more qualified. They have decided that they want to get and attain those opportunities, and in this particular case, we found a very large number of women that were as well qualified as the men. That is rewarding to us. And I don't think that we are going to have any problems in dealing with the matter once we get going.

MR. BERGMAN: Had NASA asked, six or seven or eight years ago, don't you think they would have found qualified women doctors, for example, who could have flown on Skylab?

DR. KRAFT: We did ask, and we didn't get the applicants from the standpoint of the evaluation process that were as well qualified as the ones we picked.

MR. NEWMAN: Peter?

MR. HACKES: Hackes, of NBC News. A couple of questions. First of all, I find it strange at this stage in the civilian astronaut training program of NASA that 14 out of the 15 pilots are military. Did somebody explain that? Were there not enough proportional applicants who were civilians in their background? That is the first question. Then if Chris would, or Dr. Lovelace or both, could you run through these and just give us just a line or two of what you know about each of them, maybe an outstanding characteristic either family-wise, or their background, just to give us a clue as to who they are? We don't have the astronauts with us, obviously.

DR. FROSCH: Let me take the first question. The announced requirements, the qualifications for pilots were 1,000 hours of jet flying time as principal pilot, 2,000 hours preferred, and test pilot time, both training and experience considered to be an asset if not required.

The civilian pilots who applied were generally below the test pilot experience,didn't have it, although there were a few who did, and on the whole, had fewer flying hours. Most of the candidates who were closest to being fully qualified were qualified as jet pilots, had been flying most recently as flight engineers, and had relatively little flight pilot time during the past year.

I reviewed some of the samples just to satisfy myself that that was what we were looking at, and there was no question that the most highly qualified, in terms of both general flight experience and recent flight experience and test pilot experience were the military pilots.

DR. KRAFT: Peter, let me add to that, the thing that I said a little while ago that I think was significant. We have an awful lot of people in the United States who, 10 or 15 years ago, decided that they wanted to be astronauts, and they set out, in any way they could to get the best training they possibly could to be those pilots, and the way to do that is to go into the military and be trained in high performance airplanes, get test pilot experience, because that is what we wanted in the past. That is what we think is required in the initial flying of the Space Shuttle because it is indeed a very complex vehicle to fly, until we get some experience with it at least. So it is not surprising that that was the situation.

DR. FROSCH: Can I suggest on biographical details that rather than go through a long list that we can make available capsule biographies on these people to you. We have that, don't we, Bob?

MR. NEWMAN: Well we do in Houston. We have what we have here for the press.

DR. FROSCH: Yes. These are just short capsules on each that say who they are and where they are from. I don't believe it is in the press kit, but it is available.

SPEAKER: We do have the capsules.

DR. FROSCH: You have the capsules, so you have got it in the press kit.

MR. NEWMAN: Let me return to Houston now, they have some questions there.

MR. McLEAISH: Jim Maloney?

MR. MALONEY: Originally 40 names were submitted from JSC. Were these 35 candidates taken from that list?

DR. KRAFT: Affirmative.

MR. CRIS: Nick Cris, Los Angeles Times. To Dr. Frosch or Dr. Chris Kraft, is it possible, is it likely that five names were withdrawn or withheld, or eliminated, whatever you want to call it, so that perhaps a woman or more women or more ethnic minorities could fulfill that role at a later date and be announced?

DR. KRAFT: Negative.

MR. McLEAISH: Paul Reecer, U.S, News.

MR. REECER: Okay, was a special effort or some type of formula applied in regard to the racial, social or ethnic distribution in making the selection, and if so, what was that formula, and was the formula the same for both mission specialists and pilots?

DR. FROSCH: There was no formula. There was a very strong affirmative action program to get as many candidates as we could from as wide a selection of U.S. society as possible, and particularly to get both minority and women candidates.

When it came to the selection process, there were no formulas applied. There was some attempt to balance among the professional specialities in the mission specialist category. We wanted to have some people with medical, some with biological, some with earth sciences, some with physical and chemical sciences, some with engineering backgrounds, but it was viewed in terms of professional speciality and background.

MR. NEWMAN: Any more, Houston?

MR. REECER: Okay, just to make sure I understand, you said there was no effort to fill in the five that were dropped in the 20 pilots. Do you anticipate another selection of astronauts of any description during the last time in the Shuttle program, and if so, can you say approximately when that would be?

DR. FROSCH: Well, the Shuttle program is scheduled to run for 12 years, beginning sometime in '79. I would consider it quite likely that there will be further selections, but at the moment, we don't contemplate one at any specific date, and I would expect almost certainly no further selection before we actually fly, although it is possible. It will depend on whether there are people who leave the program and what our training success is.

MR. NEWMAN: I will take it back, Houston. The gentleman in the back row.

MR. BENEDICT: Yes, Howard Benedict, AP. What is the earliest possible time that any of these new candidates named today can fly?

DR. FROSCH: Chris, do you want to comment on that?

DR. KRAFT: Well, I would think that probably the first ones would fly after what we consider the operational flight test, what we call "OFT" for the Orbiter, and those are the first six flights.

DR. FROSCH: That will be when?

DR. KRAFT: That would be probably, at the earliest, about mid to late 1980.

MR. NEWMAN: Yes sir?

MR. HINES: Bill Hines of Chicago Sun Times. Forgive me for what may seem like a "male chauvinist pig" question, it relates to Dr. Lucid who has three children, and from her age I gather that the children are rather young. She being 35 years old. I was wondering what consideration went in to her responsibilities to her children versus her responsibilities to the program and how these were resolved. They obviously were resolved by appointing her to the program, but can you tell me a little about this selection process in her case?

DR. KRAFT: If I gave you a one-word answer to Shannon Lucid's family situation the answer is "none".

We did not take that into consideration at all. However, we interviewed Shannon and I would like to tell you what she said. When we put her in the backseat of a T-38 she said that was absolute torture to put a woman in the backseat of a T-38 airplane without giving her the chance to fly it, because she has been looking forward to flying a high performance airplane all her life.

MR. NEWMAN: This gentleman over here.

MR. BETTS: Roy Betts, Ebony and Jet magazine. Dr. Kraft, I think you said that over the last 10 to 15 years a number of people throughout the country have applied to become astronauts, and I wanted to know your particular characterization of minority applications you received and whether or not you felt a trend was developing in the minority communities as to people becoming astronauts and mission specialists?

DR. KRAFT: Well in general I think that I would say that our experience in the astronaut selection, as well as our experience in the field of engineering and science in NASA has been that minorities, each year, are becoming more and more qualified.

Secondly I think we would say that we had no problem finding minorities that were totally competitive with the numbers of people that applied.

There were certainly less minorities that applied, but we did not have any problem in finding that they were competitive in the 80 and the 128 that we brought in for interview.

We did not have any trouble in finding those that were highly motivated in terms of what they wanted to do. I think that overall we were generally pleased with the response that we got, and I think that the next time we select it will be even better than it was because it is obvious that it is improving in this country.

MR. NEWMAN: Yes?

SPEAKER: Okay, a couple of questions, and again, the first one does address the minorities. About halfway through the process to accept applicants, I understand that there was some concern that you were not receiving as many as you had hoped you would be receiving and you intensified efforts in your affirmative action programs to get more individuals to apply. Can you comment on the kinds of numbers and the kinds of numbers that came in later?

DR. KRAFT: I don't think that the premise is absolutely true there. What we wanted to do in terms of our advertising campaign and the way in which we contacted all the minority groups and female organizations, women's organizations across the country was to make sure that those people were aware of what we were doing, and the kinds of people that we desired to have, and the opportunities that existed within NASA for carrying out the astronaut program. I don't think at any time we were disappointed, and frankly, it wasn't until we got very late in the time period that we really knew what we were going to get. We just wanted to make sure that we had gotten everybody that was desirous of applying.

DR. FROSCH: I would add to that that as late as the period in which I came on board, in the late Spring, with the applications closing the end of June, there was some conversation here that we weren't sure what the numbers were going to be because -- I mean total numbers -- because there was a great increase in applications towards the very end. I suppose applying to be an astronaut is like anything else, lots of people, even though they have been training for years, wait until the very end of the time to put in their applications.

In many cases I think there was a good reason to do this because they wanted -- many of these people were still in their educational process and I think they wanted to include on that application all the latest information. If they were getting a doctorate on the 5th of June, they wanted to have that doctorate listed as awarded when they put in the application, so there was a last minute pick-up of applications.

Listening to the trend of questions, I would like to make one very definite comment. Every single person on that list was selected competitively and by qualifications in terms of motivation, academic background and training. It was not necessary at any point, to my knowledge, to push anything, or force someone about whom anyone had any qualification questions.

SPEAKER: Okay, my second question is, on their arrival at JSC on a more permanent basis this summer, what will be your initial training syllabus in terms of Shuttle activities? Will you go specific into Shuttle systems or will you start out more generally with --

DR. KRAFT: No, the first few months will be classroom training,and then we will go to Shuttle systems and then go to specific kinds of training. We will try to get them familiar with the kinds of lives they will be living in terms of the environment of flying in space, space suits, working in vacuumes, flying in the backseat of T-38's for mission specialists, et cetera.

MS. DRISCOLL: Everly Driscoll, USIA. I would like to know, besides your subjective judgment, what sort of tests -- I mean, how did you choose these people? Did they take IQ tests? Was it mainly Q and A?

You mentioned, Dr. Kraft, that the Latin-American's failed the medical exam. I would like for you to follow up on that because it was my understanding that the Shuttle would not require the sort of stringent physical tests that we had in the early part of the space program. I would like to know what those physical qualifications were that they failed.

DR. KRAFT: My answer to your first question is no, we didn't give them any specific academic tests. What we did was look at their background in their colleges and universities, and the grade point average that they had, what their scores were on the tests that are given at the college level these days. We looked at their experience in training that they have had since leaving the university, or indeed while they were there.

So we did not have to go into that. We judged them on that basis before we brought them in, and then together with the interviews, in the subjective way that you described.

We, in the medical qualifications, we indeed, particularly in the mission specialists area, had a, what we felt, a minimum of qualification requirements medically, and most of them failed because of their eyes.

DR. FROSCH: I may say that the announced qualifications approved by the Civil Service Commission at the beginning of this were in terms of specific flight medical examinations of two different levels, both prescribed by the Air Force.

As I recall, for example, in eyes, the difference is that for pilots, the standard pilot requirement, they may have eyesight as bad as 20/50, but it must be correctible to 20/20. For the mission specialists I think it was 20/100 correctible to 20/20.

DR. KRAFT: It was 20/200.

DR. FROSCH: 20/200 correctible to 20/20. I have been at Johnson a few times and looked at some of the tasks that mission specialists, as well as pilots will have to do, in terms of what it is like to be in simulators for those tasks, because I asked myself the question as to whether the mission specialists needed to have that kind of vision.

My conclusion, after spending a little bit of time in the simulators is that some of the psycho-motor, the manipulatory tasks that astronauts will have to do really do require that kind of capability.

It may be in the course of space flight in the Shuttle over the years that we will learn that we have over-required, in some of those areas, but I think that now those requirements are entirely reasonable.

We would like to correct one inadvertent error. According to the numbers that I have looked at on the question of Spanish-speaking applicants, there were four who were qualified up to the medical examination. Three were disqualified on medical, one was apparently not competitive in the final findings.

DR. KRAFT: That is correct. I might point out that when you get much beyond 20/200, you are almost legally blind.

DR. FROSCH: Jules?

MR. BERGMAN: Dr. Frosch, you are saying that ccmpetitive skill alone, not race, color or creed, entered into selection?

DR. FROSCH: That is what I am saying.

MR. BERGMAN: What about the stories that have said you directed or suggested that five of the mission specialist slots be held in the hope that minority groups qualify in the next few years so they could be selected?

DR. FROSCH: That is not correct. What I have said from the beginning was that I expected, in terms of the competition, and as I began to learn about the competitors, I expected that there would be minority and women astronaut candidates.

MS. NICHOLS: Nichelle Nichols, Women In Motion, and representing ABC in Washington. Having been a former NASA contractor assisting in the Outreach to Minorities and Women, during the selection, I had received an awful lot of feedback from people who had the highest qualifications, at least according to what I was told we were looking for, and many came back saying that they received letters saying that they were over-qualified. I would like some comment on that please.

DR. FROSCH: Chris?

DR. KRAFT: No one received any information from NASA that said they were over-qualified.

DR. FROSCH: There is no question that if we had wanted, let's say, double the number of candidates, or perhaps even more, that we could have selected a considerably larger number of qualified candidates, but that is in the lists that were finally qualified.

MS. NICHOLS: Of those who -- many -- that I was given a list to do an outreach to, and did receive applications from them after -- as of February of last year, and brought those applications in. They were either told or received letters, indeed, by someone in NASA that they were over-qualified, either in management or had gone into management even though some had gone into were very qualified in research, and I find it very difficult to respond to them, and I need some answers on it.

DR. KRAFT: I can't respond to it. I don't know anything about it, and I am surprised that that is the case. We may have -- those people may have misinterpreted a response by saying that they were indeed very well qualified in the fields that they were working in, but that their qualifications did not meet the NASA requirements for either mission specialists or pilots. That is the only thing I can think of.

DR. FROSCH: I would like to have some examples of that so that we can find out what, if anything, went awry.

MS. NICHOLS: Right, then I would like to know what kind, so that I would be able to properly respond to those questions and those inquiries, what kind of letters were sent out to those who were the non-selected, but who were highly qualified. I am sure out of 8,000 applicants of qualified people, mostly qualified people, there were not only 40 or 35.

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DR. KRAFT: All of the letters that I saw, and I did not see all of the letters, of course, but I saw pilot copies of all of the letters that were sent out. The types of letters that we sent out merely said "In the first place, "You didn't meet our qualifications." We tried to be kind to people in terms of dealing with their specific cases, and I am sure that those individuals talked a great deal who were disappointed with our personnel people.

Finally, we told those people those numbers that were not interviewed that they were not selected, and that is about all we said in those letters, and then finally this morning, we are trying to call all of those people who were brought in for interviews and tell them directly that they either were selected or not selected, and indeed, all of the ones who were medically disqualified, we called those with our medical people, to tell them that particular reason.

That is the pattern that we followed, and if you have any other examples, and as Dr. Frosch had said, we certainly would be willing to deal with it.

SPEAKER: Those five who were dropped from the 40, were they military or civilian?

DR. KRAFT: All five were military. They were all military.

MR. NEWMAN: Let's try Houston again. Hal, got any questions?

MR. McLEAISH: Okay. I think we have no questions in Houston.

MR. NEWMAN: All right. Take it back here. The gentleman in the back row.

MR. BERGAUST: Eric Bergaust from (inaudible). I address this to the opening, all three. In the past, has it been the T-38, the high performance jet that blew up on the three astronauts, the three astronauts that have died in the training program, is that correct, first of all?

Then what has NASA done to alleviate or trying to get around this problem of the T-38 blowing up?

DR. KRAFT: There have been no T-38's blow up. Three of the astronauts were killed in an accident on the pad at Cape Kennedy, Cape Canaveral, the Kennedy Space Center. That was an unfortunate accident in 1967. We have had two pilots -- I am trying to make sure I got that correct. We have had two pilots killed in T-38's, Williams and Ted Freeman.

Williams was killed in a very weird accident which we have never really been able to figure out. It was a relatively new T-38, and as best we can tell, it appeared as though the ailerons locked.

Ted Freeman flew through a goose and tried to make the end of the runway and made a mistake in not bailing out.

We have had another T-38 which Pete Conrad was flying where he bailed out, and in that particular case, we had an electrical problem which was due to moisture, and that has been fixed.

Excuse me. I forgot. You are correct. We had Bassett and See were killed in St. Louis, and that was a problem of flying in very poor weather. They came out of the fog and were unable to miss a building. It had nothing to do with the performance of the T-38.

MR. BAKER: Gentlemen, Norman Baker, "Defense Space Daily." Have I been informed correctly that all of these astronauts will also fly on military as well as civilian missions?

DR. KRAFT: We really haven't decided how we are going to deal with the DoD missions at this point in time. We propose that we deal with that problem as it comes up and make our minds up at a later time as to whether we would have some special cadre of DoD pilots or not.

MR. BAKER: This was why I was asking the question, because I don't have to inform you, Dr. Kraft, but in the past, our civilian manned space program, we have had quite a bit of publicity on the astronauts and everything about them before each flight.

On the military, you know, we have a different situation, and I wondered in the future, if we are going to have two sets of criteria for talking about space flights.

DR. KRAFT: We certainly don't have two sets of criteria in terms of the qualifications for these people, but we may well have to deal with that problem when it presents itself.

MR. NEWMAN: Yes, sir.

SPEAKER: If I read correctly the answer to an earlier question, we may have among these 35 the first astronauts who are not fully qualified as space command pilots or pilot in command capabilities. Will all of them receive high performance aircraft training, or may some of them also not get that?

DR. KRAFT: Let me deal with that in a little bit of length. We have -- the 15 pilots, of course, are all qualified pilots. All have high performance jet airplane time and so forth. There are a number of the mission specialists who are also rated pilots and we will give consideration in terms of the Air Force rated pilots in high performance airplanes. We will certainly give consideration in the future as to how we might, as Bob has pointed out, cross-train these people.

As to the training of mission specialists to become pilots, per se, that is, be able to pilot the lm-5

vehicle, I think I would prefer to punt because until we get some experience with these people, we see what they want to do, they see what the situation really is in flying this vehicle and what they will be required to do and how they will experience the space flight, that it is premature to judge that.

Certainly somebody like Shannon Lucid, who has over 1,000 hours in flying -- she flies all the time, has her own airplane, is very interested in flying, and if she were willing as we go down the road, and NASA were willing, then we might very well train her in high performance jet airplanes, but let me point out to you that when you do that, it really puts a glitch in her training program because now you have got to take her out of that program, put her into learning how to fly a jet airplane, probably put her through test pilot training, get her at least 800 hours of flying or in that ballpark of high performance airplanes.

That takes a lot of doing, she may very well not want to do that because of the time involved, and I wouldn't blame her, so I think we have to play those cases as they come up.

SPEAKER: Is this approach an outgrowth of the experience during some of the previous scientist-astronaut classes where the pilot training cut into their professional time quite a bit?

DR. FROSCH: I see it as more a question of moving into an era in which we are operating in a different way. Remember that up through Apollo, the maximum number of flying at one time was three, and so the question (a) of backup and (b) of some of the flying of LM or flying of the capsule itself was very crucial.

Now we are moving into an era in which we will have up to seven people on a mission, and the question of flight back-up and the more, we hope, much more routine nature of flying and returning makes it less necessary to have that kind of back-up.

In fact, in some of our conversations about qualification and the mix of people, we have been as or more concerned with having the pilots have a capability to back up the mission specialists during the long periods of time in orbit with those operations as we have the other way.

DR. KRAFT: Your question is a good one, though, to make a point. If we look at the scientist-astronaut, what we have found is that some of them washed out in flight training, didn't make it through there. Some of them don't like to fly. Some of them don't fly today. Some of them are indeed as good as any pilots we have on our roster, and I think that is exactly what you would expect in any group of people that are as highly motivated as this group.

MS. DRISCOLL: Driscoll, USIA. I am trying to understand the selection process. It sounds like it was very subjective. If you didn't give them any tests, did you have a little chart of things you were looking for?

DR. KRAFT: Of course. We looked at the transcript of all of these people's grades, the classes and the courses they took, the experience they had in their universities, the experience they have had in what they worked in afterwards and scored the people on that basis before we brought them in for interviews.

MS. DRISCOLL: But Chris, I would assume that probably most of your 8,000 applicants would be very high -- you know, A's and B's, over achievers --

DR. KRAFT: On the contrary.

MS. DRISCOLL: Oh, really?

DR. FROSCH: There were lots who passed first series of filters, of examinations, and many who did not.

DR. KRAFT: When you have 8,000 applicants, and all you have to have is a B.S. degree, you are going to have some people that made C's and some people who made straight A's, and that is the case we had.

MS. DRISCOLL: Well, I guess I am more worried about the last filtering process.

DR. FROSCH: Let me give you an example: In the process of going from what we call the first level of qualified applicants; that is, those that had the minimum requirements as read out, who were brought to me as the most competitive applicants, they were examined in terms or their backgrounds were examined in terms of the amount of degrees beyond B.S., bachelor's degrees and the amount of experience in their field beyond the bachelor's degree: for pilots, the amount of flying experience and number of different kinds of aircraft they flew; specialized experience in fields not directly applicable as compared to degrees in fields directly applicable, both for experience and degrees; questions of how much experience and what the quality of their academics were; that is,their grades.

On the basis of that for -- to give one number -- for civiliam mission specialists, the ingoing number of 5,500 and some came down to 500 and some, so that part of the process was at least in terms of a straightforward ranking of experience and degrees, and there was a stage which I would agree is subjective. This is the stage of deciding on the basis of interviews, which bring out things like motivation, depth of knowledge in the field. A degree doesn't necessarily give you a feeling for that, and that was in a large measure subjective, but it was conducted by the entire Board.

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The whole Board interviewed them. I believe I am correct, Chris, and the Board gave independent views so that that is as objective a way in which you can do that kind of subjective process as we have.

I would also add that if I were put the problem of specifying the objective examinations to be given to people for this rather special field, my inclination would be to say that the process of specifying the examinations would in itself be subjective, although the results might be marked as objective.

DR. KRAFT: Ph.D.'s, by the way, aren't selected in a very much different process.

MR. BERGMAN: Dr. Frosch, did I misunderstand you? I thought you had said, and perhaps you did 10 minutes or so ago that had you had 70 openings instead of 35, you had 35 more equally qualified people?

DR. FROSCH: I think I said that if we had wanted double the number, we would have had no difficulty in selecting qualified people for that number.

MR. NEWMAN: Anybody else?

DR. KRAFT: Yes.

SPEAKER: Does that include minorities and women?

DR. KRAFT: Yes.

MR. NEWMAN: Any more questions in Houston?

MR. McLEAISH: This is Houston. No further questions here.

MR. NEWMAN: Okay. Looks like we have about run out of questions. Thank you all.

(Whereupon, at 2:00 p.m., January 16, 1977, the press conference was adjourned.)

NASA News
National Aeronautics and
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Washington, D.C. 20546
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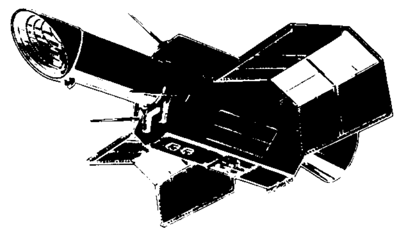
For Release IMMEDIATE

Press Kit

Project International Ultraviolet Explorer

RELEASE NO: 78-8



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RELEASE NO: 78-8

ULTRAVIOLET EXPLORER SET FOR LAUNCH

NASA, in cooperation with the European Space Agency (ESA) and the British Science Research Council (SRC), will launch an International Ultraviolet Explorer this month to study a wide range of celestial objects in one of the most important regions of the electromagnetic spectrum.

IUE will be launched into a modified synchronous Earth orbit by a Delta rocket from Cape Canaveral, Fla., about Jan. 26.

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Mailed:
January 20, 1978

With nearly 200 astronomers from 17 countries -- including the Soviet Union -- already selected to conduct observations with IUE, the spacecraft will become one of the most widely used satellites in NASA history. Studies will range from planets in our own solar system to some of the most distant objects in the universe, including quasars, pulsars and black holes in space.

IUE will be examining the spectral region which lies in the ultraviolet (UV) between 1150 Angstroms and 3200 Angstroms, a region inaccessible from the ground. This region includes the fundamental emissions of many of the common elements in the universe (hydrogen, helium, carbon, nitrogen, oxygen).

Data returned by IUE are expected to shed more light on the nature of the different kinds of stars that populate our galaxy; on the material between the stars from which stars are formed; on many of the objects that are emitting radio waves or x-rays; and on nearby galaxies such as the little-understood Seyfert galaxies (see glossary).

Quasars are among the most puzzling objects in the universe. They are estimated to be less than 10 light years in diameter, compared with the 100,000-light-year diameter of a typical galaxy of 100 billion stars; yet, quasars pour out 100 times more energy.

They are the most powerful emitters of energy known. How this enormous energy is generated is a mystery. There is no known physical process to account for it.

It is expected that new knowledge may be obtained by examining in detail relatively nearby quasars in the ultra-violet, and then comparing these data with those from the more distant quasars seen by ground observatories in visible light.

In our own galaxy, the spacecraft will look at hot stars and the outer atmospheres of "cool" stars. Cool stars are stars similar to our own Sun. They are relatively cool at their surfaces but have extremely rarefied outer atmospheres, or coronas, with temperatures of about 555,000 degrees Celsius (one million degrees Fahrenheit). Ground observatories can't study these coronas effectively, but IUE instrumentation will be able to examine them to determine their temperatures, density and chemical composition. The workings of our own Sun are expected to be better understood as a result of these investigations.

The interstellar medium of our galaxy and even the planets of our own solar system will also come in for intensive study.

The gas and dust of the interstellar medium are believed to be the product of exploding stars and the material out of which new stars are born. Scientists are interested in the composition of the "grains" floating in the space between the stars to learn more about them and how our own star was born.

Another target of IUE will be Jupiter and other planets in the solar system. Even though we have taken closeup pictures of the planets and some of their moons, we have little information concerning their emissions in the ultraviolet. Jupiter's giant red spot is of special interest, along with the four larger Jovian moons, Io, Europa, Ganymede and Callisto, and their atmospheres.

IUE will complement and extend observations made by the two NASA Orbiting Astronomical Observatories, OAO-2 and Copernicus, and ESA's TD-1 satellite. IUE will be followed by the 10-ton Space Telescope (ST) which will be launched by the Space Shuttle in 1983.

IUE will provide a rehearsal for one of the most important objectives of the ST -- a system for observing by astronomers of all nations.

The first facilities for such observations have been established for IUE by NASA at the Goddard Space Flight Center, Greenbelt, Md., and by ESA near Madrid, Spain.

With very little spacecraft operations background, astronomers from different countries will be able to use the IUE observatories without undergoing tedious training courses in specialized techniques, will be able to go into the IUE Scientific Control Center at Goddard, for example, identify their targets and begin collecting data much as they would in a ground-based observatory.

Because of IUE's geosynchronous orbit, the astronomers will be able to observe a wide variety of objects repeatedly over long periods of time. Repetition of observations using ground-based equipment has demonstrated that the spectra of many stars vary with time.

The spacecraft is an octagonal structure with the telescope protruding from the top and a fixed solar array on two opposite sides. The spacecraft, when stabilized, is designed to always maintain one side of the two arrays toward the Sun.

Spacecraft structure is of a modular design, allowing easy installation or removal of its various assemblies and components. Total weight is 671 kilograms (1,479 pounds) including the apogee boost motor. It stands 4.3 meters (14 feet) tall and is 1.3 m (4.3 ft.) in diameter at launch. When the solar arrays are unfolded in space, it is 4.3 m (14 ft.) wide. An apogee boost motor propellant places the spacecraft in its eccentric synchronous Earth orbit, 46,000 km (28,800 mi.) by 25,000 km (15,700 mi.).

At that altitude, the spacecraft will appear to drift back and forth over the equator during its expected three-year lifetime, ranging to about 29 degrees North and South latitudes. It will be in constant view from the Goddard station and in view at least 10 hours a day from the Madrid station. Onboard, hydrazine gasjjets will keep the spacecraft on station with a mean longitude of 71 degrees West.

The Goddard Space Flight Center is responsible for the design, integration and testing of IUE, and provides the U.S. ground support facilities. ESA built the solar array and the Madrid ground facilities. Britain's SRC, in collaboration with University College, London, provided the four television camera detectors for transforming the spectral displays into video signals for transmission to the ground.

In accordance with agreements among the three participating agencies, viewing time will be allocated on a one-third, two-thirds basis. NASA will have 16 hours of viewing time and then will turn over the spacecraft to ESA for an eight-hour viewing block which will be shared equally by ESA and the United Kingdom.

Goddard manages the Delta rocket program for NASA. McDonnell Douglas Astronautics Co., Huntington Beach, Calif., is the prime contractor.

(END OF GENERAL RELEASE. BACKGROUND INFORMATION FOLLOWS.)

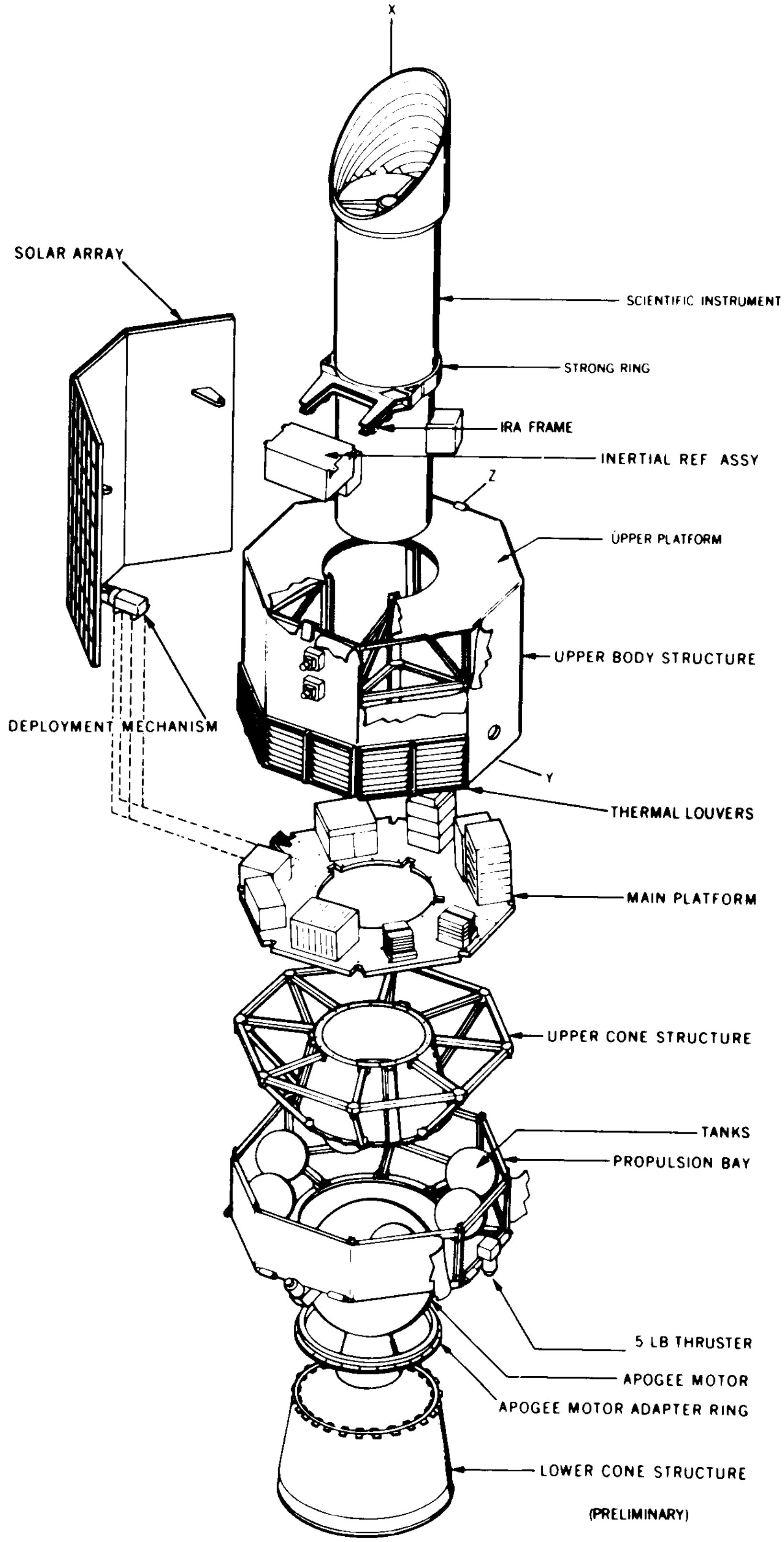
THE SPACECRAFT

The IUE is an octagonal structure with the telescope protruding from the top and a fixed solar array on two opposite sides. It is designed to maintain one face of the array toward the Sun when stabilized. Thermal control is provided by a set of thermal louvers on the dark side of the spacecraft which regulate the heat loss to space.

Most of the electronic equipment is mounted on a honeycomb platform adjacent to the louvers where the temperature will be maintained between 0 degrees and 40 degrees C. A solid propellant kick motor is used to accelerate the spacecraft to near synchronous velocity at the apogee of the transfer orbit. An auxiliary propulsion system utilizing hydrazine monopropellant occupies the lower portion of the octagonal body. The hydrazine auxiliary propulsion system (HAPS) will provide active nutation control, attitude control, spin-despin functions, east-west station keeping, momentum unloading and trajectory error correction.

The spacecraft structure is of modular design allowing easy installation or removal of its various assemblies or the components that it supports. The primary structural elements are:

- Strong Ring
- IRA Frame
- Upper Body Structure
- Main Platform
- Upper Cone Structure
- Propulsion Bay Structure
- Apogee Motor Adapter Ring
- Lower Cone Structure
- Upper Platforms



Exploded View of Spacecraft.

Power

The power system is a direct energy transfer (DET) system by which power from the solar array is transferred directly to the spacecraft bus at near 100 per cent efficiency. Elipse power and daytime power exceeding the solar array output are obtained from two nickel-cadmium batteries through a boost regulator operating at 90 per cent minimum efficiency. A control unit monitors the spacecraft bus voltage and generates signals to drive the solar array shunt regulator, battery charge controller, and battery discharge regulator in the proper sequence such that the spacecraft power system is operated at maximum efficiency during all modes of operation.

Communications

The communication system transmits telemetry data, receives ground generated commands, and provides range and range rate (R&RR) measurement capability for orbit determination. This system consists of redundant S-Band transmitters with four selectable power amplifiers, four S-Band antennas, redundant VHF transponders, and a four-element VHF antenna system.

Command System

The command system consists of a pair of redundant command decoders and a command relay unit. Ground commands can be processed by either decoder through the VHF receiver system. Additionally, all commands can be issued by the onboard computer (OBC) and processed with either decoder. Command conflict or priority establishment between ground generated or computer generated commands will be avoided by use of time-shared control of the decoder execution logic.

Scientific Instrument Systems

- Reflecting telescope for gathering light from celestial objects.

- Echelle spectrograph for forming the ultraviolet light into spectral displays.

- Television camera detectors for transforming the spectral displays into video signals suitable for telemetering.

Telescope

The telescope is a 45 cm (17.5 in.) diameter f/15 Cassegrain design, the function of which is to collect optical radiation from astonomical sources and present it to the spectrographs. The telescope will provide point-source images of about 1 arc-sec on-axis at its focal plane. The useful field of view of the telescope, 16 minutes of arc in diameter, is used to identify the desired target star for fine pointing.

• Clear aperture	45 cm (17.5 in.) diameter
• Length	130 cm (46 in.)
• Effective focal length	675 cm (263 in.)
• Effective focal ratio	f/15

Spectrographs

Light from the telescope may be directed into either of two spectrographs which are able to analyze ultraviolet radiation with a resolution about 0.1A. The short wavelength spectrograph is a three element Echelle system, containing an off-axis paraboloid as collimator, an Echelle grating, and a spherical first order grating that is used to separate the Echelle orders and to focus the resulting spectral display on the television camera. The long wavelength spectograph is identical, except that two 45 degree flats are inserted to shift the light rays diverging from the entrance aperture so that they will not interfere with the rays falling on the short wavelength collimator. Either spectrograph may be converted to a low dispersion instrument by inserting a flat in front of the Echelle grating so that the only dispersion is provided by the spherical grating.

Target Acquisition and Fine Error Sensing

Two redundant fine error sensors, each capable of multimode operation, accomplish the dual role of a field camera, target recognition and acquisition, and of an error sensor for pointing error generation. The field camera mode provides the observer with an image of the star field. This image is displayed on the ground in real time so that a guide star and the target star can be identified.

The Fine Error Sensor is then commanded to track the guide star and provide offset data so that the target star can be placed in the spectrograph aperture by the control system.

UV Spectrum Detectors

Each of the two spectrographs incorporates two UV-sensitive television cameras which are used respectively as prime and back-up spectrum detectors, either camera being selectable on command.

The UV spectrum, which the spectrograph optics focuses at the faceplate of the selected camera, is converted in wavelength to visible light and, at the same time, increased in light intensity, by means of a proximity focused wavelength converterdiode. The fiberoptic output window of this converter is optically coupled to the fiberoptic input window of a light-sensitive secondary emission conduction (SEC) vidicon tube. In a manner analogous to a photographic emulsion, the target of the SEC tube can "accumulate" an image of the spectrum. The exposure time can be varied to suit the intensity of the spectral features of the target star -- for a faint star, exposures up to a few hours may be required. When the exposure is terminated, the integrated image is "read out." Unlike normal broadcast TV cameras, the IUE cameras are operated in a digital (rather than analog) mode, using a 256 level gray scale, permitting accurate measurement of intensity of each of more than 1/2 million picture elements. Following read-out, the video data are transmitted to ground where they processed by computer using image processing software jointly produced by the U.K. and Goddard Center. This software is an advanced development of NASA's JPL VICAR computer program and the IUE software enables correction of effects such as photocathode and target non-uniformities and geometric distortions which are inherent in the SEC tubes. This software also permits the image, either "raw" as seen by the camera, or corrected to be reconstituted in the form of a "photograph" or to be plotted in terms of intensity as a function of wavelength.

Development and space qualification of the camera system involved U.K. and U.S. industry in the solution of a number of difficult technological problems which included production of light-weight, low-volume, high-stability, high-voltage supplies with output commandable up to 14KV and the development of extremely high quality UV-to-visible converters.

Thermal

The thermal system is designed to maintain proper temperature control of all onboard systems in sunlight for all solar aspect angles of from 0° (Sun on aft end of spacecraft) to 135° in the X-Z plane, and to withstand eclipse periods up to 74 minutes. To achieve the desired temperature control the thermal design employs a combination of passive and active thermal control. Three sets of thermal louvers located on the anti-sun side of the middle portion of the structure provide active thermal control for most onboard subsystems. These louvers are supplemented with black passive radiators. The remaining portions of the spacecraft surfaces are covered with a combination of multilayer insulation and special thermal coatings. Circular heat pipes mounted concentrically to the bottom of the main equipment shelf will minimize thermal gradients.

GROUND SYSTEM

The spacecraft and ground system together comprise an observatory, the facilities of which--both orbiting and on the ground--will be made available to selected guest observers. Most of these observers will need to have only a limited, superficial knowledge of the technical details and use of software systems for processing of scientific data. Instead, as astronomers, they will use the observatory in much the same manner as they would use, for example, Palomar or Lick Observatories.

Because the IUE spacecraft will be in a synchronous orbit, it will be in continuous contact with the ground systems and, therefore, the ground system can be designed to function much like a typical ground-based observatory. Resident astronomers and other trained personnel will assist the observer with all aspects of his observing program. The guest observer will leave the facility with final processed data in a form suitable for detailed interpretation and analysis.

Mission Operations

Orbiting with a geosynchronous period at a mean longitude of 71 degrees W., the spacecraft will be in continuous contact with the U.S. ground observatory. A second site--the European ground observatory Madrid, operated by ESA--will be capable of viewing the spacecraft for extended periods of at least 10 hours each day. In accordance with the international agreements, NASA will conduct observations for 16 hours per day and the European ground observatory will conduct 10 hours of observations per day on the average. Health and safety of the spacecraft is the responsibility of NASA and will be monitored from Goddard Center 24 hours per day.

Because the total IUE system is conceived to functionally resemble a typical ground-based astronomical observatory with operations conducted in real time 24 hours per day, a unique dedicated ground system is an integral part of the total system. The IUE includes both the IUE flight system and the IUE ground system. The IUE Ground System is defined to include both a U.S. ground observatory and a European ground observatory. The U.S. ground observatory includes:

- Ground station (This is the dedicated IUE telemetry/command station at the Goddard Center Network Test and Training Facility.)

- Scientific Operations Center,
- Operation Control Center

Two Xerox Data Systems (XDS) "Sigma Series" computers will be used to support all functions of the U.S. ground observatory. One, a Sigma 5 will support real-time command and control of the spacecraft and real-time image display for the observing programs. The second, a Sigma 9 will fulfill two roles: that of backup to the Sigma 5 on an "as needed" basis and as the central computer for "near real-time" image processing. Physically, both will be located within the OCC. Remote terminals to the SOC are provided.

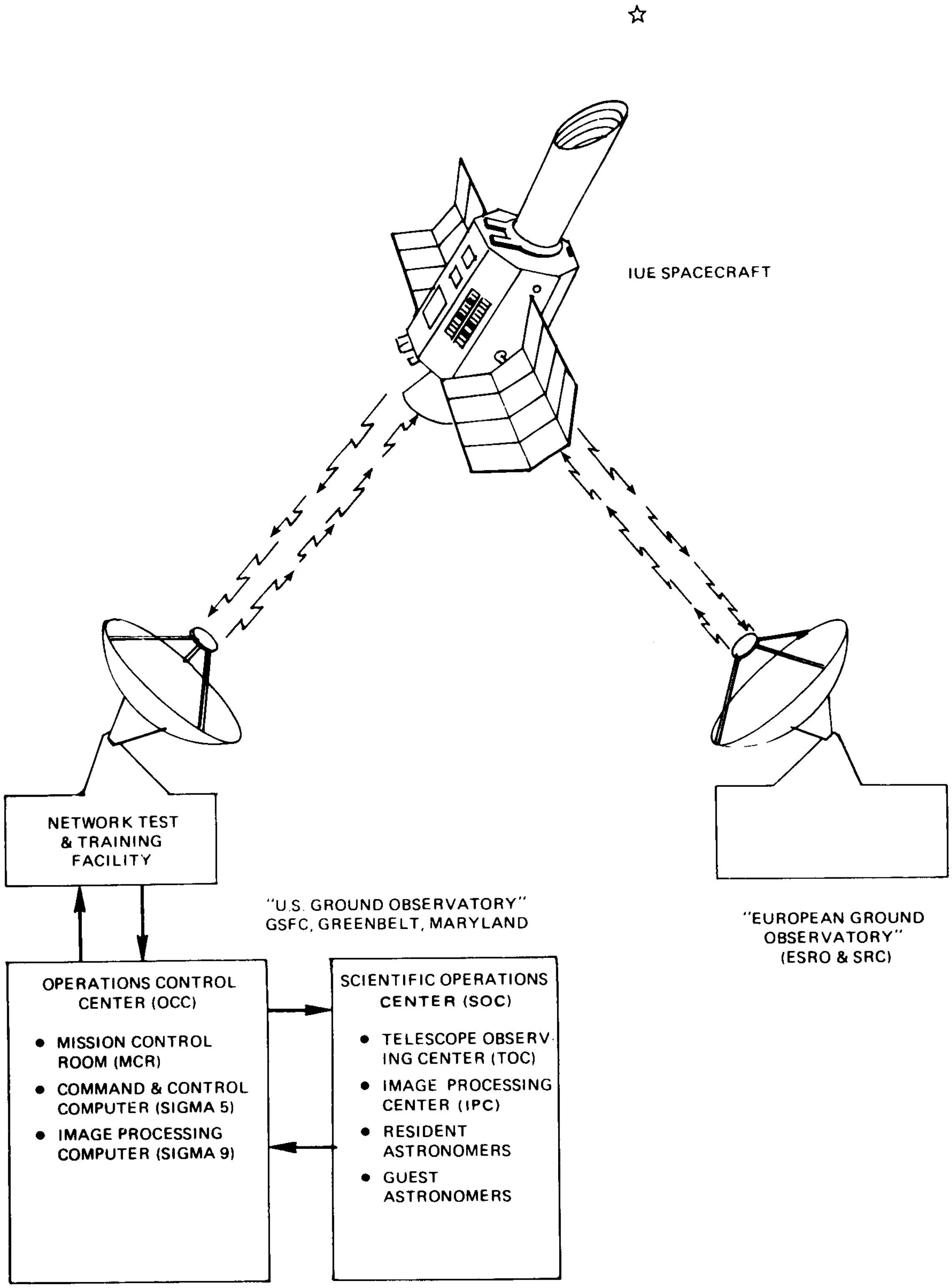
Scientific Operations Center (SOC)

Here, the planning, administrative, and management aspects of the observatory will be conducted. Space for resident astronomers and guest observers is provided. Routing real time observing programs will be conducted from the Telescope Observing Center (TOC) within this facility. Image processing will be performed by the Image Processing Center (IPC), also within this facility, by means of communication lines to/from the Sigma 9 computer located in the OCC.

Operations Control Center (OCC)

The OCC is the nerve center of the observatory Both computers are installed here. Either can process data, format command sequences, and generate real time displays of images in support of the real time operations conducted in the Mission Control Room (MCR), also a part of the OCC.

In the MCR, spacecraft controllers will monitor the status of the spacecraft and its subsystems, initial checkout of the scientific instrument as well as special observing programs will be performed from the MCR. The MCR will "hand off" the spacecraft to the European Ground observatory, and during the eight-hour ESA/SRC period of control and observing, will maintain a monitoring and standby control capability should the need arise.



IUE Observatory.

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Operations at the European ground observatory will be very similar to those described above. Main differences stem from the fact that in the ESA case the IUE operations are conducted from a single building where the OCC and SOC are located side by side. Another important difference is that a single Sigma 9 computer is used. For eight hours a day it will be dedicated to spacecraft control while for the remaining time it will be devoted to image processing activities.

Guest Observers

The IUE is an international facility which is open to both U.S. and foreign guest observers. U.S.-based guest observers will come to Goddard Center and perform their programs at the IUE Scientific Operations Center which will accommodate six to eight guest observers at one time. It is anticipated that a typical visit will last about one week and that each astronomer will have one or two observing sessions per day. At the conclusion of this visit the guest observer will have all of his data in final reduced form. Observational data will be made available to the National Space Science Data Center at Goddard after the observer has had an appropriate time for analysis and interpretation. The ESA ground observatory is similarly an international facility where guest astronomers from the ESA member states plus other European and non-European countries will conduct their observations.

DELTA LAUNCH VEHICLE

Delta 138 with its IUE spacecraft payload will be launched from Pad A, northernmost of the two launch pads at Complex 17, Cape Canaveral Air Force Station, Fla.

The second stage of Delta 138 arrived at Cape Canaveral Air Force Station in September 1977. The first stage and interstage arrived in November 1977.

The Delta first stage and interstage were erected on Pad A Nov. 29. The nine solid strap-on rocket motors were mounted in place around the base of the first stage Nov. 30. The second stage was erected Dec. 1.

The IUE spacecraft was received by the Kennedy Space Center Dec. 20 and underwent initial processing in Hangar AE.

It was moved to Explosive Safe Area 60 Jan. 12 for fuel loading and apogee boost motor installation. The spacecraft was mated with the Delta third stage Jan. 18.

The third stage spacecraft assembly was moved to Pad A and mated with Delta 138 Jan. 19. The payload fairing, to protect the spacecraft on its flight through the atmosphere, will be put in place Jan. 24.

All launch vehicle and pad operations during the launch countdown are conducted from the blockhouse at Complex 17 by a joint government-industry team.

First Stage

The first stage is a McDonnell Douglas modified Thor booster incorporating nine Castor II strap-on Thiokol solid fuel rocket motors. The booster is powered by a Rocketdyne engine using liquid oxygen and liquid hydrocarbon propellants. The main engine is gimbal-mounted to provide pitch and yaw control from liftoff to main engine cutoff (MECO).

Second Stage

The second stage is powered by the TRW-built TR201 liquid fuel, pressure fed engine that also is gimbal mounted to provide pitch and yaw control during powered flight. A cold gas system provides pitch, yaw and roll control during coast and after second stage cutoffs. The engine is capable of multiple restarts. The second stage also houses the Delta inertial guidance system which provides guidance control and sequencing of the vehicle from liftoff through third stage spinup.

Third Stage

The third stage is the Thiokol TE-364-4 spin stabilized solid propellant Thiokol motor. It is secured in the spin table mounted to the second stage. The firing of the eight solid propellant rockets fixed to the spin table accomplishes spinup of the third stage spacecraft assembly.

Injection Into Transfer Orbit

The Delta vehicle will inject IUE into a transfer orbit having an apogee of 46,342 km (28,784 mi.) a perigee of 167 km (104 mi.) and an inclination of 28.7 degrees. NASA's Spaceflight Tracking and Data Network will provide telemetry, tracking and ranging support until the spacecraft is placed in its final synchronous orbit.

IUE LAUNCH PROFILE

The first two stages of the Delta 2914 place the spacecraft into a low altitude parking orbit 167 km (104 mi.) near the first equatorial crossings. Spinup to 60 rpm, followed by injection into a transfer orbit using the Delta third stage, occurs after approximately 30 minutes in parking orbit.

Following burnout of the Delta third stage and spacecraft separation, IUE will be in transfer orbit.

Apogee Boost Motor

At apogee, the motor is commanded to ignite by ground command from Goddard Center. A backup command sequence is provided by the onboard computer to perform the burn sequence if something should happen to the ground command link. With an ABM firing at apogee, the spacecraft will be placed at the desired station point, a geographic longitude of the ascending node of 44 degrees west, and the orbit will be targeted for zero drift. If some drift does occur, the hydrazine propulsion system will be used to place the spacecraft "on station."

LAUNCH SEQUENCE FOR IUE

Event	Time	Altitude Miles	Altitude Kilometers	Velocity Mph	Velocity Km/Hr
Liftoff	0 sec.	0	0	915	1,472
Six Solid Motor Burnout	38 sec.	3.5	5.6	1,543	2,483
Three Solid Motor Ignition	39 sec.	3.5	5.6	1,545	2,486
Three Solid Motor Burnout	1 min. 17 sec.	12.7	20	2,661	4,282
Nine Solid Motor Jettison	1 min. 27 sec.	16	26	2,875	4,626
Main Engine Cutoff (MECO)	3 min. 42 sec.	58	93	12,060	19,405
First/Second Stage Separation	3 min. 49 sec.	61	98	12,077	19,432
Second Stage Ignition	3 min. 55 sec.	63	102	12,064	19,411
Fairing Jettison	4 min. 33 sec.	78	126	12,458	20,045
First Cutoff Stage II (SECO-1)	8 min. 47 sec.	102	164	17,467	28,104
Restart Stage II	40 min. 12 sec.	107	172	17,446	28,070
Final Cutoff Stage II (SECO-2)	40 min. 30 sec.	107	172	17,954	28,888
Third Stage Spinup	41 min. 20 sec.	106	170	17,957	28,892
Second/Third Stage Separation	41 min. 22 sec.	106	170	17,957	28,892
Third Stage Ignition	42 min. 3 sec.	107	172	17,956	28,891
Third Stage Burnout	42 min. 47 sec.	109	176	23,273	37,447
Third Stage/Spacecraft Separation	43 min. 50 sec.	127	204	23,217	37,356

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TRACKING, COMMAND AND DATA ACQUISITION

Goddard Space Flight Center is responsible for providing STDN network support for the spacecraft and launch vehicle during launch and transfer orbit operations. For geosynchronous orbit operations, Goddard will provide command, telemetry acquisition and realtime data transmission from the Network Test and Training Facility (NTTF) station at Goddard. Additional STDN stations will be scheduled to backup NTTF as needed. They will use existing standard equipment and communication links. VHF range and range-rate tracking is required of a STDN station for station keeping. The STDN station at Merritt Island, Fla., will provide prelaunch preparation and checkout support for the launch vehicle and the spacecraft. For the launch and transfer orbit phases, all STDN stations that view the spacecraft will support IUE. The primary STDN station supporting the IUE mission will be the NTTF at Goddard. Daily, the NTTF will provide 16-hour continuous support for all command and data acquisition functions for the realtime operations conducted in the SOC and/or OCC. Backup support to ESA will be provided during the remaining eight hours when the spacecraft is under the control of the European ground observatory.

IUE/DELTA TEAM

NASA Headquarters

Dr. Noel W. Hinners	Associate Administrator for Space Science
Andrew Stofan	Deputy Associate Administrator, Space Science
T. Bland Norris	Director, Astrophysics Programs
John R. Holtz	Director, Explorers, Sounding Rockets, Balloons, Airborne
Leon Dondey	Manager, Astronomy Explorers
Dr. Nancy Roman	Program Scientist
John F. Yardley	Associate Administrator for Space Flight
Joseph B. Mahon	Director, Expendable Launch Vehicles
Peter Eaton	Manager, Delta

Goddard Space Flight Center

Dr. Robert S. Cooper	Director
Robert E. Smylie	Deputy Director
Robert N. Lindley	Director of Projects
Robert C. Baumann	Associate Director for Space Transportation Systems
Donald V. Fordyce	Associate Director for Projects
Gerald W. Longanecker	Project Manager
Dr. Albert Boggess	Project Scientist
Frank A. Carr	Deputy Project Manager/ Technical
Jack W. Peddicord	Deputy Project Manager/ Resources
Kenneth O. Sizemore	Spacecraft Manager
Dennis C. Evans	Scientific Instrument Manager
Charles F. Fuechsel	Mission Operations Manager
Ivan J. Mason	Project Operations Director
Dr. Donald K. West	Observatory Administrator
Thomas E. Ryan	Mission Support Manager
William E. Hawkins	Network Support Manager
Thomas Janoski	Network Operations Manager
David W. Grimes	Delta Project Manager
John Langmead	Deputy Delta Project Manager, Resources
Robert Goss	Mission Analysis and Integration Manager, Delta Project Office
Frank Lawrence	Delta Mission Integration Manager

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Kennedy Space Center

Lee R. Scherer	Director
Dr. Walter J. Kapryan	Director, Space Vehicle Operations
George F. Page	Director, Expendable Vehicles
W. C. Thacker	Chief, Delta Operations
Wayne McCall	Chief Engineer, Delta
John Dunn	Spacecraft Coordinator

United Kingdom

M. O. Robbins	Director for Astronomy, Space Radio and Science, SRC Headquarters
Dr. F. Horner	Director, Appleton Laboratory
Peter J. Barker	Project Manager
Prof. Robert Wilson	Project Director and Senior Scientist, University College, London

European Space Agency

Roy Gibson	Director General
Dr. Ernst Trendelenberg	Director of Scientific and Meteorological Programs
Prof. Gianni Formica	Director of the European Space Operations Center
Maurice Delahais	Head of Scientific Programmes Department
Dr. Edgar Page	Head of Space Science Department
Dr. F. Duccio Macchetto	ESA Project Manager

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CONTRACTORS

Prime Contractors

Goddard Space Flight Center Greenbelt, Md.	Spacecraft
McDonnell Douglas Astronautics Co. Huntington Beach, Calif.	Delta

Major Subcontractors

Hamilton Standard Division United Aircraft Corp. Windsor Locks, Conn.	Hydrazine Auxiliary Propulsion System
Bendix Corp. Guidance Systems Division Teterboro, N.J.	Inertial Reference Assembly and Reaction Wheels
Bendix Corp. Aerospace Systems Division Ann Arbor, Mich.	Experiment Display Systems
Bendix Field Engineering Corp. Columbia, Md.	Ground Station Operations Support
Information, Development and Applications, Inc. (IDEAS) Beltsville, Md.	Electronic Fabrication and Testing Support
Ball Brothers Research Corp. Boulder, Colo.	Fine Error Sensors and Panoramic Attitude Sensors
Computer Sciences Corp. Systems Sciences Division Silver Spring, Md.	Ground Station and Control Center Software Support
MRC Corp. Hunt Valley, Md.	Mechanical Fabrication Support
Adcole Corp. Waltham, Mass.	Sun Sensor Assemblies
Ithaco, Inc. Ithaca, N.Y.	Wheel Drive Assemblies

Major Subcontractors (cont'd.)

Sperry Rand Corp. Sperry Support Services Huntsville, Ala.	Quality Assurance Support
Parsons Corp. of California Stockton, Calif.	Structural Fabrication Support
General Electric Co. Battery Business Dept. Dayton, Ohio	Spacecraft Batteries
General Electric Co. Space Division Beltsville, Md.	Mechanical and Electronic Design and Fabrication Support
Applied Optics Center Corp. Burlington, Calif.	Scientific Instrument Optics
Zeta Laboratories, Inc. Mountain View, Calif.	S-Band Transmitter Modules
Aydin Monitor Systems Ft. Washington, Pa.	Sequential Decoders

United Kingdom Contractors

Marconi Space and Defense Systems Applied Electronics Laboratories (prime)	Spectrograph Camera Systems
Westinghouse Electric Corp. Electronic Tube Division	SEC Vidicon Tubes
ITT, Electro-Optical Products Division Tube and Sensor Labs	UV Image Converter Tubes
Solar Systems, Inc.	Alignment, Focus and Deflection Coil Assemblies
Royal Aircraft Establishment Space Department	Electronics Parts Control
Atomic Energy Research Establishment	Failure Analysis Support

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United Kingdom Contractors (cont'd.)

Yarsley Research Laboratories Ltd.	Materials Consultants
University of Surrey Department of Mechanical Engineering	Experimental Stress Analysis

ESA Contractors

Snias, France	Solar Arrays
AEG, Germany	Solar Cells
Harris Semiconductor Division Harris Intertype Corp. Melbourne Fla.	Integrated Circuits
Thiokol Corp. Elkton Division Elkton, Md.	Apogee Boost Motors
Westinghouse Electric Corp. Electronic Tube Division Elmira, N.Y.	SEC Vidicon Tubes
Westinghouse Electric Corp. Baltimore, Md.	Central Processor and Power
Motorola, Inc. Government Electronics Division Scottsdale, Ariz.	Random Access Memories
RCA Corp. Astro Electronics Division Princeton, N.J.	Thermal Louvers
RCA Service Co. Lanham, Md.	Control Center and Flight Operations Support
Systron-Donner Corp. Concord, Calif.	Nutation Sensor Assemblies
ITT Electro-Optical Products Division Tube and Sensor Labs Ft. Wayne, Ind.	UV Image Converter Tubes

ESA Contractors (cont'd.)

Boeing Aerospace Co. Seattle, Wash.	Radiation and Shielding Studies
OAO Corp. Beltsville, Md.	Mission Support Services
TRW, Inc. TRW Systems Group Redondo Beach, Calif.	Integrated Circuits
Telefile Computer Products, Inc. Irving, Calif.	Ground Computer Equipment
Perkin-Elmer Corp. Boller & Chivens Division South Pasadena, Calif.	Camera Selector Mechanism
Perkin-Elmer Corp. Applied Optics Division Costa Mesa, Calif.	Scientific Instrument Optics

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GLOSSARY

Binary Star	A pair of stars orbiting about each other under mutual gravitational attraction.
Black Holes	Objects resulting from complete gravitational collapse beyond that of a neutron star. The accompanying gravitational field is so intense that no radiation can escape.
Electromagnetic Spectrum	The ordered array of known electromagnetic radiations, extending from those with the shortest wavelengths, cosmic rays, through gamma rays, X-rays, ultraviolet radiation, visible radiation and including microwave and all other wavelengths of radio energy.
Exploding Galaxies	Violent, energetic explosions centered in certain galactic nuclei where the total mass of ejected material is comparable to 5 million average stars. Jets of gas 1,000 light years long are typical.
Galaxy	A large system of stars held together by mutual gravitational attraction.
Neutron Stars	Remnants of supernovae explosions. They consist of ultra-dense matter composed almost entirely of neutrons which have been squeezed together by the force of gravity exerted by the collapsing matter.
Pulsars	Believed to be rotating neutron stars. The intensity of their radiation in the electromagnetic spectrum is modulated by the period of rotation. Additional periodicities have also been observed.
Quasars	Quasi-Stellar Objects. Very controversial. Quasars seem to be the size of large stars, yet they emit energy at all wavelengths comparable to that of a thousand galaxies. Characterized by very large redshifts.
Seyfert Galaxies	Unusual spiral galaxies characterized by small, extremely bright nuclei containing one to 10 billion stars. They are orders of magnitude brighter in the X-ray than in the visible part of the spectrum.

Supernova	A catastrophic stellar explosion ocurring near the end of a star's life in which the star collapses and explodes, manufacturing the heavy elements which it spews out into space. Visible luminosity may reach 100 million times that of the Sun.
Ultraviolet Radiation	Electromagnetic radiation of shorter wavelength than visible radiation; roughly, radiation in the wavelength interval from 100 to 400 Angstroms.

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NASA News

National Aeronautics and
Space Administration

Washington, D.C. 20546
AC 202 755-8370

For Release:

IMMEDIATE

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RELEASE NO: 78-9

LANDSAT 1 EARTH RESOURCES SATELLITE IS RETIRED

Landsat 1, the world's first spacecraft designed to monitor and discover the Earth's natural resources was retired by NASA Jan. 16, 1978, after operating five and a half years in outer space. The multispectral scanner, a camera-like device carried by Landsat 1, has revolutionized the technology of observing the Earth from space.

Designed with a life expectancy of only one year, Landsat 1 was launched in 1972. The spacecraft "more than achieved its goals, in fact, beyond any stretch of the imagination," said Ron Browning, Landsat Project Manager at NASA's Goddard Space Flight Center in Greenbelt, Md.

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Mailed:
January 23, 1978

Browning said problems with the pitch wheel, the device which automatically keeps the satellite and its instruments pointed toward the Earth, have worsened during the past two years and that time-command problems have also developed. Both tape recorders on the satellite have long been inoperative, the first stopping in August, 1972 and the second in July 1974.

Since the latter date the satellite has been transmitting its images of Earth directly to ground stations around the globe as they came within the satellite's range. Problems with the pitch wheel brought these operations to a halt.

Landsat 2, launched in 1975, is still in orbit and will be joined by a third Landsat in March of this year. The instruments on this third Landsat will be improved versions of those carried by the first two.

Landsat 1's more than 300,000 pictures of different parts of the world demonstrated the potential of remote sensing from Earth resources spacecraft in the fields of geology, oceanography, agriculture, forestry, hydrology, urban planning, crop prediction and many other resources disciplines.

Such data are important to the United States and the rest of the world as well. Global analysis of food and mineral resources alone are important to economic planners worldwide. These data can be updated rapidly and frequently as the Landsat spacecraft covers each point on the globe every 18 days returning 80-meter (240-feet) resolution pictures of Earth in 185 kilometer (115 miles) by 185 km segments, in four spectral bands, as it passes 915 km (570 mi.) overhead.

Data received from the Landsat satellites are received by three U.S. ground stations as well as one each in Canada, Brazil and Italy. The information is sold to users for nominal fees. Two more stations are under construction in Iran and Japan and another is planned by Argentina.

Data received by U.S. stations are sent to Goddard for pre-processing and distributed to data distribution facilities of the Department of Interior, Department of Agriculture and the National Oceanic and Atmospheric Administration.

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NASA News

National Aeronautics and
Space Administration

Washington, D.C. 20546
AC 202 755-8370

For Release:

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RELEASE NO: 78-10

SUMMARIES OF TWO U.S.-SOVIET MEETINGS ISSUED

NASA and the U.S.S.R. Academy of Sciences have confirmed the summaries of results of meetings held between the two agencies in November.

One meeting, held in Moscow, Nov. 14 through 17, concerned possible cooperative scientific experiments using the U.S. Shuttle and the Soviet Salyut spacecraft. At the other meetings, held at Wallops Island, Va., Nov. 19 through 25 and in Bethesda, Md., Nov. 16 through 18, experiments flown on a recent Soviet biosatellite as well as proposals for future biosatellite missions and medical results of manned space flight were discussed.

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Mailed:
January 25, 1978

In Moscow the two agencies discussed preliminary scientific proposals and scientific experimental areas that might benefit from a long duration station of the Salyut type and a reusable Shuttle spacecraft. The joint working groups agreed to meet in the United States in late March or early April, in Moscow in July and again in the U.S. in October 1978.

The Bethesda and Wallops Island meetings discussed information on experience gained in manned space flight programs, in particular, the Salyut 5/Soyuz 21 and 24 missions. Also discussed were preliminary results from U.S. and Soviet experiments flown on Cosmos 936 in August 1977. The U.S.S.R. also invited the U.S. to participate in Soviet biosatellite flights in 1980 and 1981.

A ninth meeting of the space biology and medicine working group will be held in the U.S.S.R. in the second half of 1978.

The talks are being held as part of ongoing activities under the U.S.-Soviet Space Cooperation Agreement.

Copies of the Summaries of Results are attached.

SUMMARY OF RESULTS

TALKS BETWEEN REPRESENTATIVES OF THE US NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AND THE USSR ACADEMY OF SCIENCES ON THE OBJECTIVES, FEASIBILITY AND MEANS OF ACCOMPLISHING JOINT EXPERIMENTAL FLIGHTS OF A LONG DURATION STATION OF THE SALYUT TYPE AND A REUSABLE SHUTTLE SPACECRAFT.

Moscow, November 14-17, 1977

In accordance with the agreement of May 24, 1977 between the United States and the USSR concerning cooperation in the exploration and use of outer space for peaceful purposes and the agreement of May 11, 1977 between the US National Aeronautics and Space Administration and the USSR Academy of Sciences on cooperation in the area of manned space flight talks were held in Moscow, November 14-17, 1977, between Soviet and American specialists on the proposed Shuttle/Salyut project.

1. Discussions of scientific and technical questions relating to the proposed project were carried out in two Working Groups: a Joint Working Group for Basic and Applied Scientific Experiments (Experimental Group) and a Joint Working Group for Operations (Operations Group).

2. During the meeting the working groups, as foreseen in the Agreement of May 11, 1977, considered the feasibility and means of carrying out a joint experimental program using a long-duration station of the Salyut type and a reusable Shuttle spacecraft.

3. The Joint Working Group for Basic and Applied Scientific Experiments preliminarily considered the following scientific proposals which could be carried out within the framework of a Shuttle/Salyut program.

(1) Radio astronomy experiments using an aperture synthesis system.

(2) Infrared interferometry.

(3) X-ray astronomy.

(4) Gamma-ray astronomy.

(5) Cosmic ray research.

(6) Research on physical conditions in active regions of the sun.

(7) Space biology and medicine.

(8) Laser absorption spectroscopy for studying pollution of the upper atmosphere.

(9) Radio sounding for radiophysical investigation of the Earth's atmosphere.

(10) Space processing.

(11) Active (controlled) experiments in the Earth's magnetosphere and ionosphere.

(12) Space meteorology and study of earth resources.

Of these proposals a common interest was expressed at this time in the following research areas:

-- High energy astrophysics (gamma-ray astronomy, x-ray astronomy and cosmic rays);

-- Atmospheric research;

-- Active experiments in the magnetosphere and ionosphere;

-- Medical and biological experiments;

-- Radio astronomy.

All the proposals discussed at this meeting (including space processing, solar physics and infrared interferometry) are subject to further study. The inclusion of a possible research or experimental area in the list of areas considered at this meeting does not commit the sides to include or not to include it in any program of joint experiments. The list of areas subject to further study may be supplemented by agreement of the sides. Each Joint Working Group Co-Chairman will designate for his side the specialists responsible for developing recommendations in each appropriate research area and will submit a list of such specialists to the other side by March 1, 1978. The work of the specialists in each area will be carried out by correspondence and--if necessary--through special meetings by the agreement in each case of the respective Joint Working Group Co-Chairman.

The proposals transmitted by the Soviet scientists to the American specialists are listed in Attachment 1. The list of proposals presented orally by the American side in the course of the meeting is in Attachment 2. The proposals of the American scientists, including consideration of the discussion which took place during the Working Group meeting, will be sent to the Soviet side by March 1, 1978.

4. The Joint Working Group for Operations identified the following basic assumptions for planning of the proposed joint scientific Salyut/Shuttle program.

a. During the joint separate flights, experiments may be conducted which require interaction and mutual orientation of the two spacecraft.

b. Large size scientific equipment to be installed inside or outside the Salyut may be delivered by the Shuttle.

c. Some small size experiments may be delivered to orbit inside the Salyut.

The Working Group also identified three possible operating modes, or combinations thereof, in which the scientific experiments utilizing the Salyut/Shuttle may be conducted:

Mode A - The Salyut and the Shuttle are two mutually oriented spacecraft.

Mode B - The Salyut and the Shuttle are docked to each other.

Mode C - The Salyut operates the scientific experiments delivered by the Shuttle.

Basic specifications and preliminary information on the capabilities of the Salyut and the Shuttle were exchanged as set forth in Attachment 3. Each side agreed to prepare a handbook with technical specifications and operations parameters for their spacecraft including sketches and block diagrams. These handbooks will be exchanged by January 1, 1978.

Additionally, the Operations Working Group discussed and basically agreed to the USSR proposed list of requirements to the spacecraft systems imposed by possible scientific experiments and equipment. This list is set forth in Attachment 4.

The USSR proposed outline of a document, "Preliminary Technical Proposal for Program Accomplishment" (Attachment 5) was accepted in principle and it was agreed that at the next meeting the required contents of the document would be discussed. It was also agreed that the main areas of onboard systems compatability such as mission phases, docking systems, joint flight dynamics, equipment installation (including use of manipulator), onboard electrical compatability, radio communications, life support, etc. will be discussed at the next meeting.

5. The sides agree that the further work of the Joint Working Groups should proceed as follows:

-- The Joint Working Groups will meet in the United States in late March or early April 1978. At that time the Joint Working Group for Basic and Applied Scientific Experiments will discuss the proposals of the two sides and prepare preliminary versions of possible scientific programs. The Experimental Group will also discuss the requirements placed on Shuttle and Salyut with respect to scientific experiments. At the March/April 1977 meeting the Joint Working Group on Operations will exchange materials and discuss the technical requirements for compatible spacecraft systems, as well as conducting a preliminary discussion and evaluation of the feasibility of the preliminary versions of possible scientific programs proposed by the Experimental Group.

-- The two Joint Working Groups will then meet in July 1978 in the USSR. At that time the Groups will agree on a preliminary selection of a possible experimental program and a preliminary division of work between the sides on scientific materials and equipment, sufficient to permit each side to estimate its own costs. The Operations Group will prepare a preliminary evaluation of the feasibility of the proposed versions of scientific programs and continue its work on compatible spacecraft systems.

-- The two Joint Working Groups will meet in October 1978 in the United States to decide on recommendations for a program of scientific experiments and to reach conclusions on the technical feasibility of such a program. At that time the Joint Working Groups will also prepare the documents foreseen for the first phase of joint work in accordance with the agreement between the US National Aeronautics and Space Administration and the USSR Academy of Sciences of May 11, 1977. At the October meeting the groups will also consider a joint management plan for carrying out the recommended program and will discuss the technical documentation such a program would require.

6. The sides informed each other of the following designations:

a. Dr. Noel W. Hinners as the Chairman of the Joint Working Group for Basic and Applied Scientific Experiments from the US side.

Mr. R. Z. Sagdeyev as the Scientific Research Program Leader and Mr. I.A. Zhulin as the Chairman of the Joint Working Group for Basic and Applied Scientific Experiment from the USSR side.

b. Mr. Glynn Lunney as the Chairman of the Joint Working Group for Operations from the US side.

Mr. Yu. P. Semenov as the Chairman of the Joint Working Group for Operations from the USSR side.

7. This Summary of Results shall enter into force after its confirmation by the Administrator of the US National Aeronautics and Space Administration and the President of the USSR Academy of Sciences, and the parties shall communicate with each other with respect to such confirmation by correspondence within 30 days of this date.

Done in Moscow, November 17, 1977 in duplicate in the English and Russian languages.

For the US National
Aeronautics and Space
Administration

Dr. Noel W. Hinners

For the Academy of
Sciences of the USSR

Academician B. N. Petrov

ATTACHMENT I

USSR SPECIALISTS PROPOSALS FOR THE JOINT EXPERIMENT PROGRAM OF THE SALYUT/SHUTTLE MISSION

1. USSR WDI-002 Radioastronomy space system of aperture synthesis (RAKSAS)
2. USSR WDI-003 Space infrared interferometer
3. USSR WDI-004 Proposals to scientific program on X-ray astronomy for the Salyut/Shuttle mission
4. USSR WDI-005 "SAGA" experiment (USSR/US experiment on gamma-astronomy)
5. USSR WD1-006 Exploration of physical conditions in active solar areas
6. USSR WD1-007 Active (controlled experiments for the Salyut/Shuttle mission)
7. USSR WD1-008 Absorption laser spectroscopy of upper atmosphere pollution
8. USSR WD1-009 Experimental study of Atmospheric Radiophysics by atmosphere radiosounding using the Salyut and Shuttle spacecraft
9. USSR WD1-010 Cosmic Rays experiments
10. USSR WD1-011 Proposals for the USSR/US joint experiments in the area of "matter and space technology"
11. USSR WD1-012 Space meteorology and natural resources studies.

Attachment 2

ORAL PRESENTATIONS BY AMERICAN SIDE

1.	General Objectives in High-Energy Astrophysics	McDonald
2.	Possible Directions of Research in Space Medicine and Biology	Winter
3.	Prospects for Satellite Experiments in Global Study of Upper Atmosphere Composition	Jaffe
4.	Active Experiment Possibilities in the Study of the Magnetosphere and Ionosphere	Kennel

ATTACHMENT No. 3

SALYUT STATION/SHUTTLE SPACECRAFT BASIC TECHNICAL PARAMETERS AND SCIENTIFIC EQUIPMENT REQUIREMENTS

(preliminary)

I.0. Fundamental characteristics of Space Shuttle and the Salyut space station

	Salyut	Space Shuttle
1.1. Orbit parameters		
- altitude	350/400 km	350-400 km
- inclination	51.6°	51.6°
1.2. Total flight duration	1.5-2 years	7 days
1.3. Dimensions		
length	21 m	37.1 m
maximum size including solar batteries (Salyut) and wingspan (Space Shuttle)	30-33 m	23.8 m
maximum diameter	4.2 m	
1.4. Mass characteristics (before docking with space Shuttle)		
mass	26 tons	88.4 tons with total load
I_x	1.2×10^5 kgm^2	(TBD)*
I_y	1.2×10^6 kgm^2	(TBD)*
I_z	1.0×10^6 kgm^2	(TBD)*
1.5. Coordinates of the mass center (the origin of Salyut coordinates along the longitudinal axis in the plane of the Soyuz docking ring 4100 mm)		
X_c	- 2.7 m	65%
Y_c	0	0
Z_c	0	0

*) To be determined after scientific equipment is defined

1.6. Distance between the mass center and Salyut/Shuttle docking interface	9.3 m	(TBD)*
1.7. The number of crew members	2	2 crew plus up to 5 scientists
1.8. Orientation accuracy		
- inertial	10 min	0.5°
- orbital	50 min	0.5°
1.9. Instrument pointing, accuracy, inertial	20 min	2°
orbital	1°	2°
1.10. Docking system hatch dimensions	920 mm (limited by 2 chords to the distance of 700 mm)	920 mm
2.0. Basic requirements of Salyut and Space Shuttle for the Scientific Equipment		
2.1. Mass of scientific equipment		
- to be installed outside the Salyut spacestation (Delivered by the Shuttle)	5 to 10 t	
- to be installed inside the Salyut space station (Delivered by the Shuttle)	0.5 t	

- to be installed inside Space Shuttle (total mass of the launched equipment)	20 t
- Possible to be returned to earth by Space Shuttle	up to 12 t
2.2. Dimensions of scientific equipment delivered by Space Shuttle to be installed outside the Salyut (it may consist of multiple units)	diameter 4 m length 16 m (overall)
- delivered by Space Shuttle to be installed inside the Salyut space station	diameter 0.6 m length 0.6 m
2.3. Power available for consumption of the scientific equipment: -	
- onboard the Salyut space station	up to 2 kw
- onboard Space Shuttle (during independent flight)	up to 7 kw (steady) up to 12 kw (peak)
3.0. Basic parameters of the flight program	
3.1. Experiment duration	
- Space Shuttle and the Salyut space station are two mutually oriented objects (mode A)	TBD
- the Salyut space station and Space Shuttle are docked (mode B)	up to 5 days
- Salyut uses the scientific equipment delivered by Space Shuttle (mode C)	0.5 years

3.2. Distribution of functions for motion control:

- in mode A the relative orientation is provided by Salyut and Space Shuttle independently; relative position of the mass center is provided by Space Shuttle
- in mode B the orientation is provided by TBD
- -in mode C the assembly orientation is provided by Salyut

3.3. Exposure time for scientific observations

- in mode C - one month or more (with interruptions)

3.4. Distance from which the investigations can be started in mode A — 3000-4000 km

4.0. Coordinate systems for the joint flight

- in mode A
  Salyut coordinate system
  Space Shuttle coordinate system
- in mode B
  Active spacecraft coordinate system
- in mode C
  Salyut coordinate system

ATTACHMENT No. 4

Basic parameters of scientific equipment needed for the feasibility analysis.

1. Experiment initiator
2. Goals
3. Measurement range
4. Field of vision
5. Exposure time for one observation, needed number of observations
6. Relative position of objects
   - base
   - accuracy of maintaining it
   - accuracy of base data
7. Acceptability of orientation engine plumes (in general/for exposure)
8. Time for preparation for exposure
9. The number of dockings for conducting one set of experiments
10. The number of days for the program implementation
11. Crew participation
12. Telemetry requirements:
    - number of parameters
    - Recording Rate
    - general flow (bit/sec)
    - volume per data session
    - volume per day

13. Power consumption (Salyut/Space Shuttle) (average, peak)
14. Accuracy of onboard time reference
15. Equipment content (Salyut/Space Shuttle)
16. Equipment dimensions (Salyut/Space Shuttle)
17. Equipment Mass (Salyut/Space Shuttle)
18. Distribution of duties between sides (proposed)
19. Status of the equipment readiness
20. Requirements for necessary ground-based testing
21. Requirements for necessity and location of control panels and testing
22. Required accuracy of object orientation
23. Requirement for Power source (direct-alternate)
24. Command requirements (Ground-onboard)

ATTACHMENT No. 5

"THE PRELIMINARY TECHNICAL PROPOSALS FOR
PROPOSED
IMPLEMENTATION OF THE/SALYUT-SHUTTLE MISSION"

PURPOSE.

This document defines joint preliminary technical proposals for implementation of the Salyut-Shuttle Mission, project milestones, calling for both sides interaction, including mission objectives, joint scientific program, flight model and program, description of the Salyut-Shuttle orbital complex, system compatibility concept, mission control guidelines, crew and mission controllers training, joint activities organisation and schedule.

C O N T E N T S

9.3. Experimental Development of Compatible Systems

10. Groundrules for Mission Control, Mission Controllers/ Crew Training.

11. Organization of Activities.

12. Schedule.

SUMMARY OF RESULTS

EIGHTH MEETING OF THE US-USSR WORKING GROUP

ON SPACE BIOLOGY AND MEDICINE

Wallops Island, Virginia, USA

November 19-25, 1977

and

THE ASSOCIATED WORKSHOP ON HYPOKINESIA

Bethesda, Maryland, USA

November 16-18, 1977

1. The Joint Working Group on Space Biology and Medicine held its eighth meeting at Wallops Island, Virginia, USA, November 19-25, 1977. This meeting was held pursuant to US NASA/USSR Academy of Sciences Summary of Results of January 21, 1971, which was endorsed by the US-USSR Space Cooperation Agreements of May 24, 1972 and May 18, 1977. The participants are listed in Attachment 1.

2. The Working Group continued to discuss information on experience gained in manned space flight programs, in particular, the Salyut 5/ Soyuz 21 and 24 missions.

3. The Working Group discussed the Joint Space Biology Flight Experiment Program.

   3.1 Preliminary results of the analyses of data from US and Soviet experiments flown on Cosmos 936 in August 1977 were discussed. The Working Group noted the successful completion of the scientific and technical objectives of the joint experiments flown on Cosmos 936.

   3.2 Supplemental reporting requirements for Cosmos 936 experiments are contained in Attachment 2. The Soviet side invited the US side to participate in a Cosmos 936 final results symposium to be held in Moscow in the second half of 1978. Additional details on the symposium and US participation in it will be agreed in correspondence between the Co-Chairmen by March 31, 1978.

3.3 The Soviet side informed the Working Group of its plans for scientific investigations to be performed on a biological satellite in 1980. The Soviet side invited the US side to participate in this flight. Both sides exchanged ideas about the types of experiments which could be performed on the 1980 biosatellite. The US side agreed to respond with proposals by May 15, 1978.

3.4 The Soviet side informed the US side of a biological satellite expected to be flown in 1981 and invited the US side to participate in this flight. Both sides exchanged ideas on the types of experiments which could be conducted and the US side agreed to respond to the Soviet invitation by December 31, 1977.

4. The US side informed the Soviet side about the general characteristics of the Shuttle/Spacelab system, including the Life Sciences module, Common Operations Research Equipment, Spacelab Payload Accommodations, and the possibility of conducting medical and biological experiments in this system. The US Co-Chairman invited the Soviet side to participate in these experiments and informed the Soviet side of the procedures to be followed in the future in order to submit proposals for consideration for flight.

5. The Working Group also gave special attention to ground-based work, in particular:

5.1 The US side presented the research approach and anticipated investigations for understanding, predicting and preventing space motion sickness. The Soviet side presented a paper on the mechanisms of vestibular-vegetative disturbances which are observed during the initial phase of weightlessness and the means of counteracting these disturbances.

5.2 The US side presented the results of the Spacelab Mission Demonstration Test (III) emphasizing the operations and mission management.

5.3 The Working Group considered the problems of laboratory simulation of weightlessness (Hypokinesia) discussed at the associated Workshop in Bethesda, Maryland, November 16-18, 1977. The agenda of the Workshop is contained in Attachment 3.

5.4 The Working Group noted the importance of conducting hypokinesia experiments and discussed the problems of standardization of research methods. It concluded that it is necessary to coordinate in the future such studies, methods, and procedures, and to exchange data and results obtained by both sides. Jointly prepared proposals to achieve these objectives are listed in Attachment 4.

5.5 The sides exchanged information on the forecasting of man's health in weightlessness. The sides agreed that it would be desirable to associate their respective specialists involved in forecasting man's health in weightlessness with the joint Hypokinesia studies proposed in Attachment 4.

6. The materials listed in Attachment 5 were exchanged prior to or at the meeting.

7. The Joint Working Group agreed to consider at its next meeting the following topics:

   7.1 Results of flight studies performed during the preceding year.

   7.2 Results of major ground-based studies performed during the preceding year.

   7.3 Joint flight experiment programs in Space Biology and Medicine.

   7.4 Forecasting of man's health state in Hypokinesia (Simulated Weightlessness).

   7.5 Results of vestibular research conducted during the preceding year.

8. The parties agreed to hold the ninth meeting of the Joint US-USSR Working Group in the USSR in the second half of 1978. The exact date and place of the meeting as well as the final agenda will be determined through correspondence between the Co-Chairmen. Available materials relating to the agenda items will be exchanged so that the other side will have them 30 days in advance of the next meeting.

9. The Joint Working Group suggests that the principals of the January 1971 Summary of Results approve these recommendations, in whole or in part, within 30 days from this date, after which those recommendations which have been approved shall enter into force.

10. The text of this protocol has been prepared in the English and Russian languages, both versions of which have equal status.

Co-Chairmen

Dr. David L. Winter

Dr. N. N. Gurovsky

Wallops Island, Virginia, USA
November 25, 1977

Attachment 1

LIST OF PARTICIPANTS

Eighth Meeting of the US-USSR Working Group
on Space Biology and Medicine
Wallops Island, Virginia, USA
November 19-25, 1977
and
The Associated Workshop on Hypokinesia
Bethesda, Maryland, USA
November 16-18, 1977

US Members and Experts of the Working Group

1.	D. L. Winter	NASA Headquarters
2.	R. R. Hessberg	NASA Headquarters
3.	R. M. Farrell	NASA Headquarters
4.	A. E. Nicogossian	NASA Headquarters
5.	S. Deutsch	NASA Headquarters
6.	R. S. Johnston	Johnson Space Center
7.	L. F. Dietlein	Johnson Space Center
8.	J. A. Rummel	Johnson Space Center
9.	J. L. Homick	Johnson Space Center
10.	C. H. Leach	Johnson Space Center
11.	P. C. Rambaut	Johnson Space Center
12.	J. C. Sharp	Ames Research Center
13.	H. Sandler	Ames Research Center
14.	K. A. Souza	Ames Research Center
15.	E. M. Holton	Ames Research Center
16.	P. A. Thibideau	NASA Headquarters
17.	L. F. Hanold	NASA Headquarters
18.	R. Lavroff	Interpreter

Attachment 1

LIST OF PARTICIPANTS CONTINUED

USSR Members and Experts of the Working Group

1.	N. N. Gurovsky	Ministry of Health USSR
2.	L. I. Kakurin	Institute for Medico-Biological Problems of the USSR Ministry of Health
3.	N. M. Rudnyi	Aviation and Space Medicine Service of the USSR Air Force
4.	A. V. Yeremin	Y. A. Gagarin Center for Cosmonaut Training
5.	N. S. Novikov	Academy of Sciences (USSR)
6.	I. I. Bryanov	Institute for Medico-Biological Problems of the USSR Ministry of Health
7.	V. V. Voronin	USSR Ministry of Health
8.	V. V. Verigo	Institute for Medico-Biological Problems of the USSR Ministry of Health
9.	A. M. Genin	Institute for Medico-Biological Problems of the USSR Ministry of Health
10.	E. A. Ilyin	Institute for Medico-Biological Problems of the USSR Ministry of Health
11.	A. N. Liubimov	USSR Ministry of Health
12.	Y. V. Natochin	I. M. Setchenov Institute of Evolutionary Physiology and Biochemistry
13.	V. S. Oganov	Institute for Medico-Biological Problems of the USSR Ministry of Health
14.	Y. P. Simonov	Government Institute for International Relations of Moscow

Provisions For Data Exchange,
Final Report Preparation and Publication of Results of
Joint Experiments Flown on Cosmos 936

(Supplement to Attachment 3F of the Protocol of the Seventh Meeting of the Joint US-USSR Working Group on Space Biology and Medicine, Yerevan, USSR September 20-29, 1976)

1. The US side presented preliminary results on experiments K202, K203, K204, K205 (ectopic osteogenesis), K206, K207 and K208. The US side will transmit preliminary reports by January 15, 1978. The Soviet side transmitted its report, "Preliminary Results of Scientific Experiments on the Cosmos-936 Biosatellite," including material on experiments K202, K205 (ectopic osteogenesis), and K206. As previously agreed, both sides exchanged published periodical and newspaper articles on Cosmos 936.

2. In order to complete the analysis of K204 data, the Soviet side will provide the US side with approximately 20 kg of the Soviet rat diet and 2 kg of the sunflower seed oil used in the Soviet diet by January 31, 1978. The results of this additional analysis will be included in the final report.

3. The US final report on experiments K202, K203, K204, K205, K205 (ectopic osteogenesis), K206, K207, and K208 will be transmitted to the Soviet side by June 30, 1978. The Soviet side will transmit its final report on joint experiments K202, K205 (ectopic osteogenesis), and K206 to the US side by the same date.

4. The right to first scientific publication of the preliminary and final results obtained by US scientists in experiments K202, K204, K205, K207 and K208 belongs to the US side; the preliminary and final results may be published after the Soviet side receives the US preliminary and final reports, respectively. Subsequent scientific publication may be both unilateral and bilateral with the Soviet side. The first scientific publication of preliminary and final results of experiments K203, K205 (ectopic osteogenesis), and K206 will be prepared jointly by US and Soviet specialists.

US/USSR
BEDREST (HYPOKINESIA) WORKSHOP

Wed., Nov. 16

0900 - Welcome and Introductions
Dr. D. Winter
Dr. N. Gurovsky

SESSION I - Comparison of Horizontal and Headdown Bedrest Results		
0930	USSR - Comparative Model of Weightlessness	Genin
1045	USSR - The C-V System under Artificial Hypokinesis	Kakurin
1145	US - The Cardiovascular System Response to Bedrest	Sandler
1245	Lunch	
1400	Discussion	
SESSION II - Bone and Muscle Changes Observed During Bedrest		
1430	US - Bone and Muscle	Rambaut
1530	USSR - Bone and Muscle	Oganov
1630	Discussion	
1730	Recess	

Thurs., Nov. 17

SESSION III - Fluid, Electrolyte and Endocrine Changes Observed During Bedrest		
0900	US - Fluid and Electrolyte	Leach
0945	US - Endocrine	Danellis
1045	USSR - Water and Electrolyte Metabolism	Natochin
1145	Discussion	
1230	Lunch	
SESSION IV - Use and Value of Countermeasures		
1345	USSR - Methods of Prophylaxis	Kakurin
1445	US - Cardiovascular Countermeasures	Johnson
1600	US - Musculoskeletal Countermeasures	Schneider
1700	Discussion	
1800	Recess	

Fri., Nov. 18

SESSION V - The Usefulness of Animal Models in Simulated Weightlessness		
0900	USSR - The Value of Animal Models	Ilyin
1015	US - Primates as Animal Models	Bourne
1115	Discussion	
1200	Closing Remarks	
1230	Adjourn	

Attachment 4

PROPOSED PROGRAM PLAN FOR US/USSR STUDIES IN HYPOKINESIA AND OTHER TECHNIQUES FOR THE SIMULATION OF WEIGHTLESSNESS

1.0 Introduction: As a result of previous studies of human responses to hypokinetic conditions it has become apparent that absolute bed rest can be utilized to evoke many of the physiological processes which result from exposure to the weightless environment.

2.0 Program Definition: A US/USSR program in hypokinesia should consist of the following elements:

2.1 Standardization of methodology

2.1.1 Prior to initiation of joint studies, documentation will be prepared that describes physical, chemical and biological methods to be utilized. All previous agreements on methodology and all improvements that have subsequently occurred will be consolidated.

2.2 Specific Study Projects

2.2.1 The program envisages a series of specific studies utilizing hypokinesia to develop information in the following areas:

- Cardiovascular and musculoskeletal responses
- Mechanisms underlying physiological changes
- Countermeasures
- Standardization of procedures
- Maintenance of crew health and facilitation of readaptation to terrestrial conditions

2.2.2 An initial study will assess the adequacy of the developed standardized procedures during simultaneous hypokinesia experiments conducted in the US and the USSR. It will consist of a one week period of hypokinesia preceded by a two week ambulatory period and followed by a two week ambulatory period.

3.0 Implementation

3.1 Types of Possible Cooperation:

3.1.1 Standardization of experimental conditions and methodologies

3.1.2 Joint development of experiment protocols

Attachment 4

3.1.3 Consolidation of experiments

3.1.4 Exchange of investigators

3.1.5 Identification and testing of promising countermeasures

3.1.6 Interpretation and publication of results

3.2 Schedule for Initial Study:

3.2.1 First drafts of experiment proposals and standardization documents will be exchanged by May 1, 1978.

3.2.2 Second draft of documents will be exchanged by July 1, 1978.

3.2.3 Final agreement on proposals will be reached at the next Working Group Meeting.

3.2.4 The study will be initiated in second half of 1978.

3.2.5 Preliminary results will be exchanged 60 days following completion of test protocol.

3.2.6 Agreement on the exchange of scientists to support cooperative studies will be reached at next Working Group Meeting.

Attachment 5

LIST OF MATERIALS EXCHANGED AT OR PRIOR TO THE

EIGHTH MEETING OF THE US-USSR WORKING GROUP

ON SPACE BIOLOGY AND MEDICINE

Wallops Island, Virginia, USA

November 19-25, 1977

and

THE ASSOCIATED WORKSHOP ON HYPOKINESIA

Bethesda, Maryland, USA

November 16-18, 1977

Submitted by the Soviet side

1. Laboratory Modeling of the Effects of Weightlessness on the Human Organism. (Genin)
2. Some Characteristics of the Cardiovascular Function under Horizontal and Head Down Tilt Bed Rest Conditions. (Kakurin)
3. The Dynamics and Mechanisms of Changes in the Musculo-Skeletal Systems Under Bed Rest Conditions. (Oganov)
4. Water and Electrolyte Metabolism During Bed Rest of Different Duration. (Natochin)
5. Use and Effectiveness of Countermeasures During Experimental Modeling. (Kakurin)
6. The Study of Biological Effects of Extended Weightlessness Under Laboratory Experimental Modeling on Animals. (Ilyin)
7. Some Aspects of Vestibular Problems in Space Medicine. (Bryanov)
8. Biomedical Results from Two Visits to the Salyut 5 Orbital Station. (Yeremen)
9. Preliminary Results of Scientific Experiments Conducted on Board the Biosatellite "Kosmos 936." (Ilyin)

10. Prediction of Health Status in Space Flight. (Verigo)

11. Mathematical Modeling of Human Respiration. (Verigo)

Submitted by the US side

1. The Cardiovascular System Response to Bedrest. (Sandler)

2. Calcium and Nitrogen Balance in Crewmembers of One 84-Day Skylab IV Orbital Mission. (Rambaut)

3. Fluid and Electrolyte Changes Observed During Bedrest. (Leach)

4. Endocrine Changes Observed During Bedrest. (Danellis)

5. Fluid Volume Changes Induced by Spaceflight and Fluid Replacement as a Countermeasure. (Johnson)

6. Attempts to Prevent Bone Mineral Loss During Prolonged Bedrest. (Sandler)

7. Monkeys as Bedrest Models. (Bourne)

8. Space Motion Sickness: Current Research on Issues of Importance for Future Manned Space Flight. (Homick)

9. Postural Equilibrium Following Exposure to Weightlessness Spaceflight. (Homick)

10. Life Sciences Spacelab Mission Development Test III, R+30 Day Report.

11. Life Sciences Spacelab Mission Development Test III, Quick Look Summary.

12. The Apollo Soyuz Test Project Medical Report.

13. Cardiovascular Effects of Weightlessness. (Sandler)

14. A Baseline for Predicting the Human Physiological Response to Weightlessness. (Rummel)

15. Spacelab Payload Accommodation Handbook.

NASA News

National Aeronautics and
Space Administration

Washington, D.C. 20546
AC 202 755-8370

For Release

IMMEDIATE

Nicholas Panagakos
Headquarters, Washington, D.C.
(Phone: 202/755-3680)

RELEASE NO: 78-11

JUPITER ORBITER PROBE IS NAMED FOR GALILEO

A 1982 NASA mission designed to place an orbiting spacecraft around Jupiter and send a probe into its atmosphere has been formally designated as Project Galileo.

Dr. Robert A. Frosch, NASA Administrator, this week announced the new designation honoring the 16th Century Italian astronomer who was the first to observe the planet by telescope and who discovered the moons of Jupiter.

Scheduled to become the first planetary spacecraft to be carried aboard NASA's Space Shuttle, Galileo will conduct the most detailed scientific investigation yet of Jupiter, its environment and moons, including the first direct measurements of the planet's atmosphere.

-more-

Mailed:
January 23, 1978

The mission is composed of an orbiter which will circle the planet for at least 20 months and a probe which will plunge deeply into Jupiter's atmosphere. The orbiter will carry 10 instruments, and the probe will carry six.

Galileo is the first planetary spacecraft to be named for a person, although NASA's Orbiting Astronomical Observatory 3 (OAO-3) was christened Copernicus after it was launched in 1972.

Peering through the newly-invented telescope, Galileo Galilei in January, 1610, was the first to see the four larger moons of Jupiter, although he did not immediately recognize them as such. The satellites, known as the Galilean moons, are named Io, Europa, Ganymede and Callisto, after four lovers of the god Jupiter (Zeus) in Greek mythology. These are the satellites which will be closely investigated by the orbiter during the Galileo mission.

-more-

In March 1610, Galileo published the "Starry Messenger," which announced the discovery of many stars, marking on the surface of the Moon and the satellites of Jupiter. This was the first scientific publication written in lay language. The publication made Galileo famous, popularized the science of astronomy and established a firm support for the Copernican (sun-centered) theory of the motion of the planets.

- end -

NASA News

National Aeronautics and
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AC 202 755-8370

For Release:

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IMMEDIATE

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RELEASE NO: 78-12

NEW DEVICE FOR GLAUCOMA SURGERY DEMONSTRATED

A new device to reduce and regulate pressure inside the eye during glaucoma surgery has been developed by NASA's Lewis Research Center, Cleveland, Ohio, and the Kresge Eye Institute, Detroit. The new system, to be demonstrated Jan. 29 at the International Glaucoma Congress II in Miami Beach, Fla., also provides continuous recording of pressure inside the eye during surgery. The device is based on fluid systems and components technology developed by NASA.

The equipment was developed by the Lewis Center and Cleveland ophthalmologist Dr. William J. McGannon and Dr. Dong H. Shin of Kresge Eye Institute, Wayne State University, Detroit.

-more-

Mailed:
January 25, 1978

Drs. Shin and McGannon have been conducting animal studies and preliminary clinical applications using the new equipment.

Glaucoma, characterized by elevated pressure inside the eye, occurs widely in this country and throughout the world. Medical treatment to reduce and control the pressure is not always successful. In such cases, surgery may be used to relieve the pressure.

The pressure reduction system mechanically lowers the intraocular pressure -- pressure inside the eye -- to any level desired by the physician over a set time and in a controlled manner. The system has a number of apparent potential uses. It may be most immediately useful in dealing with those glaucomas in which intraocular pressure remains markedly elevated in spite of medical treatment immediately prior to glaucoma surgery.

The pressure regulator is designed to maintain a set minimum pressure inside the eye within a reasonable range during glaucoma surgery. The device has accomplished this.

A fluid supply, whose pressure has been matched to the existing intraocular pressure, is connected to the anterior (front) chamber of the eye through a very small tube inserted near the edge of the cornea. Pressure of the fluid supply is reduced in a controlled fashion and in such a way that the intraocular pressure is reduced by the same amount and at the same rate.

The pressure regulator part of the system is a flow-compensating device that adjusts automatically to maintain the set minimum intraocular pressure after the eye has been opened by surgical penetration during the glaucoma surgical procedure. If only very small liquid flows are expected during the surgery and after surgical penetration of the eye, intraocular pressure can be established and maintained by adjusting pressure of the fluid supply alone and the pressure regulator need not be a part of the system.

Investigations with the system have shown that intraocular pressure excursion peaks resulting from external loads such as surgical manipulation are reduced if the interior eye resting pressure is first lowered. Such reduction of the peak pressures is to be expected and might have been predicted.

-more-

Use of this new system however, reduces such intra-ocular pressure excursion peaks even further because the penetrating tube becomes a pressure relief mechanism.

The system will permit investigating, and may also be instrumental in reducing, some post eye surgery complications such as cataract formation, vascular membrane detachment, flat anterior chamber and malignant glaucoma. Further development of the device will be continued under controlled clinical conditions.

-end-

NASA News

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For Release:

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IMMEDIATE

Don Worrell
Marshall Space Flight Center, Huntsville, Ala.
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RELEASE NO: 78-13

EXPLORER 1 LAUNCHED 20 YEARS AGO

America's first artificial Earth satellite, Explorer 1, was launched 20 years ago Jan. 31.

The 13.9 kilogram (30.8 pound) object, shaped like a stovepipe, 15.2 centimeters (6 inches) in diameter and 203.2 cm (80 in.) long, ushered the U.S. and the western world into the age of space. Explorer 1's principal scientific achievement was a major one -- the discovery of the Van Allen Radiation Belts surrounding Earth.

-more-

Mailed:
January 26, 1978

Explorer 1 was prepared and launched by two Army organizations which are now elements of NASA: the development group of the Army Ballistic Missile Agency (ABMA), Huntsville, Ala., and the Jet Propulsion Laboratory (JPL), Pasadena, Calif. The development group of ABMA was transferred to NASA and became the nucleus of the new Marshall Space Flight Center in 1960. Some 1,400 employees who helped launch Explorer 1 still work at the Marshall Center. JPL was assigned to the space agency in December 1958.

ABMA provided the modified Redstone booster and the basic satellite design, while JPL furnished the solid propellant upper stages of the carrier vehicle and packaged and tested the payload.

Explorer 1's launch from Cape Canaveral, Fla., by a Jupiter C vehicle came at 10:48 p.m. EST, Jan. 31, 1958, which was 84 days after the Department of Defense gave the Army group the go-ahead to prepare the orbiter as a backup to the existing Vanguard satellite project.

The small satellite dispatched information on the space environment to Earth stations until May 23, 1958, when its batteries were exhausted. The vehicle, however, continued to orbit for several years. It reentered March 31, 1970.

The project that culminated in the launch of the Explorer 1 satellite actually had its beginning several years earlier. As early as 1954, the rocket group at Huntsville, led by the late Dr. Wernher von Braun, had proposed orbiting a satellite with available missile hardware.

The proposed multi-stage vehicle would have a Redstone missile as the first stage and would carry solid-propelled upper stages. JPL and the Office of Naval Research joined the fledgling program, to be called "Project Orbiter." But "Project Vanguard," a Naval Research Laboratory/National Academy of Sciences program, was selected as the nation's satellite program and the Orbiter was shelved.

While the Orbiter proposal was turned down, work did not stop entirely on the multi-stage launch vehicle.

The same combination of a multi-stage vehicle was needed at the time for testing reentry nosecones to be used on ballistic missiles. The von Braun group used the proposed vehicle, called the Jupiter C (Composite Reentry Test Vehicle), to develop ablative type materials for war heads that could withstand the extremely high reentry heat.

-more-

The third Jupiter C launched in the reentry heat test series sent a one-third scale model nosecone into space Aug. 8, 1957. The object was recovered from the Atlantic Ocean by the Navy after a flight of 1,930 kilometers (1,200 miles) with a peak altitude of more than 966 km (600 mi.). This was the first U.S. manmade object recovered from outer space and the flight proved the feasibility of the ablative-type nosecone.

During the mid-1950s Marshall Center engineers and scientists did some design work and very modest development work on a satellite. The late Josef Boehm, who worked then in the guidance section and later in the center's Astrionics Laboratory, designed a complete satellite in 1954.

The unofficial satellite program had reached a point by early 1957 where there even was a plan for a satellite tracking computer and data gathering system.

Development problems slowed the Vanguard project and in the wake of the first two Russian Sputnik launchings, the Army was told to be ready to put an American satellite into space. When the Defense Department's Nov. 8, 1957 order came, all that was needed to start things rolling was to fabricate the satellite and assemble the Redstone solid-fuel rocket assembly for the launch vehicle.

JPL fabricated the satellite designed by Boehm. The primary difference in Boehm's proposed satellite and the JPL version was that the cylindrical device was made from metal instead of fiberglass as proposed by Boehm. JPL also provided the solid upper stages.

Dr. James Van Allen, of the State University of Iowa, designed the scientific package carried into space. The radiation detection experiment discovered the Van Allen radiation belt around the Earth, a major scientific finding of the decade. The Explorer 1 launch was a part of this country's participation in the International Geophysical Year.

-end-

NASA News

National Aeronautics and
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Washington, D.C. 20546
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For Release
WEDNESDAY,
February 1, 1978

Nicholas Panagakos
Headquarters, Washington, D.C.
(Phone: 202/755-3680)

RELEASE NO: 78-14

LIVING ORGANISMS FOUND INSIDE ANTARCTIC ROCKS

Scientists working for NASA and the National Science Foundation have discovered living organisms hidden inside rocks in the frozen deserts of the Antarctic.

The discovery--made in the Dry Valleys, a region whose harsh climate resembles conditions found on Mars--significantly extends the known limits of life on Earth, and also carries important implications for the search for extraterrestrial life.

The discovery was made by Dr. E. Imre Friedmann and Dr. Roseli Ocampo-Friedmann of Florida State University at Tallahassee, a husband-and-wife team who has been searching for microbial life in rocks for more than 15 years.

Mailed:
January 26, 1978

- more -

The newly-discovered microorganisms--bacteria, algae and fungi--have been isolated and are growing in laboratory cultures, where they are being studied for clues to the secret of their endurance.

The Friedmanns had found living cells inside rocks in the hot desert areas of America, Asia and Africa, but the Dry Valleys of Antarctica have long been regarded as lifeless. No plant or animal life is visible on the bare cliffs, and microbiological investigations of the soil--as well as theoretical investigations--indicated that they are lacking any native microbial life.

Although part of the "White Continent", the Dry Valleys region of the Antarctic is generally free of snow and ice, the combination of dryness and cold, as well as the nearly constantly blowing winds, results in an environment which is among the world's harshest.

In this frozen brown desert, mountain ranges as high as 2,400 meters (8,000 ft.) alternate with valley floors, some of which contain permanently frozen lakes of high salt content.

Far from being lifeless, the Friedmanns found that the Dry Valleys have a widespread rich microbial vegetation under the surface of rocks, in the air spaces of porous rocks or in fissures.

When the rocks are broken open, the organisms are seen as a dark greenish layer, a few millimeters deep.

Dr. Friedmann said the tiny organisms take refuge from an unfavorable climate by occupying a microscopic niche where favorable conditions for life prevail. He points out: "The microclimate between the minute grains of the rock may be quite different from the macroclimate outside."

The organisms colonize light-colored semi-translucent rocks in which the intensive Antarctic sunlight penetrates several millimeters deep. Thus, while the temperature outside (and on the surface of the rock) may be well below freezing, inside the rock it may rise to relatively comfortable levels.

The penetrating sunlight also provides energy for photosynthesis, while the uppermost rock layer protects the microorganisms from damage due to excessive radiation and drying up, Dr. Friedmann said.

- more -

Dr. Friedmann said that wherever the "proper" rock types occur, it is most likely that they are colonized by microbes, algae or fungi.

Dr. Richard S. Young, NASA's chief of planetary biology, points out that the Dry Valleys in many ways approach the environmental extremes found on Mars by the 1976 Viking landers. These landers searched the Martian soil for signs of microbial life and organic molecules, apparently without success.

"If Martian life forms exist only in the interior of Martian rocks, as is principally the case in the Antarctic, that could easily serve as an explanation for the lack of evidence on Mars", says Young. "Viking could not break open rocks and analyze the interiors."

Young continues: "This interesting (if speculative) analogy is of considerable interest to NASA in designing future attempts to study planetary surfaces for evidence of life.

"If under these conditions of environment life is most likely to reside in the interiors of certain rock types, the design of the spacecraft would be influenced accordingly.

"For example, we would search out specific rock types and design a sampler which can open such rocks and provide subsurface samples which can be examined for life forms and organic molecules. This would lead to quite a different mission sequence than was done in Viking."

Dr. Friedmann expects that studies of the newly-discovered life forms now under way will yield further information on their distribution and way of life.

The Friedmanns' work was supported by research grants provided by NASA and NSF.

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78-H-20

(NOTE TO EDITORS: A report on the research is being released simultaneously by the National Science Foundation.)

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National Aeronautics and
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Washington, D.C. 20546
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For Release:

IMMEDIATE

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RELEASE NO: 78-15

TESTS SCHEDULED ON NASA CLEAR AIR TURBULENCE WARNING INSTRUMENT

Scientists from NASA's Ames Research Center, Mountain View, Calif., and the National Oceanic and Atmospheric Administration's (NOAA) Environmental Research Laboratory in Boulder, Colo., will begin flight testing this month on an instrument concept designed to give pilots several minutes' warning of an impending encounter with clear air turbulence.

The atmospheric phenomena known as CAT, for clear air turbulence, has been a problem since the beginning of the jet age. These naturally occurring, tempestuous air currents can unexpectedly add bumps to an aircraft's smooth ride even though the sky is cloudless.

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Mailed:
January 27, 1978

As its name implies, CAT occurs in clear air. Thus the pilot cannot see it and has no indication of when or where it will be encountered. Needed is a simple, reliable cockpit instrument to alert pilots as they approach CAT.

The CAT detector to be tested uses an infrared (IR) water vapor radiometer to measure the amount of moisture present in the atmosphere.

NOAA scientist Dr. Peter Kuhn, an experimenter on NASA's Gerard P. Kuiper Observatory (a C-141 aircraft equipped with a large telescope for astronomy research) noticed that extreme turbulence encountered by the aircraft was often accompanied by variations in the amount of water vapor in the atmosphere as measured by his IR radiometer.

At that time, the instrument was designed to measure the amount of water vapor in the atmosphere above the aircraft to define atmospheric conditions in the telescope's field of view.

Dr. Kuhn, intrigued with the idea that it might be possible to "see" areas of turbulence ahead of an aircraft, suggested mounting another IR radiometer in the aircraft, this time aimed forward.

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The forward-looking system successfully detected turbulence. With the help of a simple program in the computer aboard the research aircraft, CAT occurrences were being predicted from two-and-one-half to five-and-one-half minutes before actual encounter.

These results were encouraging because clear air turbulence could be detected by identifying water vapor discontinuities in the air ahead of an airplane.

But there were still problems. Since the mission of the C-141 aircraft requires flying highly accurate flight paths through the cold stratosphere, there was no opportunity to purposely search out CAT areas and to fly into them from different directions at various altitudes. Moreover, the researchers wanted to experiment with filters which could change the "look" distance to the encounter and provide information on the depth of the disturbance. They also wanted more time to "fine tune" the instrument for optimum results and to minimize the false alarm rate for such a system.

Accordingly, NASA and NOAA set up a joint program, making plans to conduct exhaustive tests on the device using a NASA Lear Jet Research Aircraft.

Research flights with the CAT warning device aboard a Lear jet will begin in January in the skies over Colorado. The aircraft will be based at Stapleton International Airport at Denver for periods of up to a week.

Researchers hope the flight program will lead to development of a low cost system which can be installed in any aircraft. It would operate unattended and require minimum maintenance service. If it is found feasible it will produce a cockpit visual alert from four to 15 minutes in advance of a CAT encounter.

Such an instrument could enhance safety and comfort of flight by giving pilots warning of imminent turbulence encounters, allowing time for the flight and cabin crews to prepare for turbulence or possibly to avoid turbulent areas.

NASA's interest in CAT detection began in the late 1960s with investigation of a laser Doppler detection concept.

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NASA News

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IMMEDIATE

RELEASE NO: 78-16

JOHN F. MCCARTHY NAMED LEWIS CENTER DIRECTOR, EFFECTIVE OCT. 1

Dr. John F. McCarthy, Jr., is to become Director of NASA's Lewis Research Center in Cleveland, Ohio, on Oct. 1, 1978.

Dr. McCarthy is currently the Director of Massachusetts Institute of Technology's Center for Space Research. He has been a professor of aeronautics and astronautics at MIT since 1971, and is a widely recognized expert in systems engineering and vehicle design.

Before joining the staff of MIT, Prof. McCarthy was with the Los Angeles Division, North American Rockwell Corp. (now Rockwell International Corp.), where he was Vice President, Systems Engineering.

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Mailed:
January 28, 1978

Other key positions held earlier at North American Rockwell included Vice President, Research and Engineering, and Executive Vice President, Technical, at the Los Angeles Division; Vice President, Research and Engineering, North American Aviation Divisions Office; Vice President of Research, Engineering and Test for the Space Division; and Assistant Chief Engineer, Apollo, and Directorships in Control Systems, Technology, and Space Sciences, at the Space Division.

Born in Boston in 1925, McCarthy attended MIT where he received S.B. and S.M. degrees in aeronautical engineering in 1950 and 1951. After graduation he joined the staff of MIT's Aeroelastic and Structures Research Laboratory and was responsible for the design and operation of one of the first variable Mach number supersonic test sections, in which he performed some of the earliest successful supersonic flutter tests. In 1962 he received a Ph.D. in aeronautics and physics from the California Institute of Technology.

McCarthy is the author of numerous technical papers; a fellow and former director of the American Institute of Aeronautics and Astronautics (AIAA); an associate fellow of the Royal Aeronautical Society; a member of Sigma Gamma Tau, Research Society of America and Sigma Xi.

He is a member of the Air Force Scientific Advisory Board and Chairman of the Aeronautical Systems Division Advisory Group of the Air Force Systems Command. He is a member of the Joint Strategic Target Planning Staff (JSTPS) Scientific Advisory Group for the Joint Chiefs of Staff, a member of the American Management Association's Research and Development Planning Council, a former member of the executive committee of the Aerospace Division of the American Society for Engineering Education, and has been a member of the NASA Research and Technology Advisory Council, Panel on Space Vehicles since 1974.

McCarthy is married to the former Camille Dian Martinez. He has five children -- four daughters and a son.

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